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New Series, No. 4

THE BATS OF IRAN:
SYSTEMATICS, DISTRIBUTION, ECOLOGY

ANTHONY F. DeBLASE

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ALYCE MYERS DeBLASE
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ABSTRACT

Thirty-eight species of bats are known to occur in Iran: *Rousettus aegyptiacus, Rhinopoma microphyllum, R. hardwickei, R. muscatellum, Taphozous perforatus, T. nudiventris, Rhinolophus ferrumequinum, R. bocharicus, R. hipposideros, R. euryale, R. mehelyi, R. blasii, Asellia tridens, Triaenops persicus, Myotis mystacinus, M. emarginatus, M. nattereri, M. bechsteini, M. blythi, M. capaccinii, Vespertilio murinus, Eptesicus nasutus, E. bobrinskoi, E. nilssoni, E. bottae, E. serotinus, Nyctalus leisleri, N. noctula, N. lasiopterus, Pipistrellus pipistrellus, P. kuhli, P. savii, Barbastella leucomelas, Otonycteris hemprichi, Plecotus austriacus, Miniopterus schreibersi, Tadarida teniotis,* and *T. aegyptiaca.* The Iranian distribution of each of these is discussed in detail and mapped. Pertinent described subspecies are discussed and subspecies determinations are made for most Iranian specimens. All available ecological data on Iranian specimens is compiled and discussed.

One species, *M. bechsteini,* is reported from Iran for the first time. Five species are removed from the Iran faunal list: *Myotis myotis* and *Pipistrellus mimus,* due to misidentification; *P. nathusii* and *P. coromandra,* due to inadequate data to support the previous reports; and *E. walli,* because it is here placed in synonymy with *E. nasutus.* Five species, *Rhinolophus lepidus, Hipposideros fulvus, Pipistrellus nathusii, P. rueppelli,* and *Barbastella barbastellus,* are shown to occur near Iran and thus to be potential additions to the Iranian fauna. Zoogeographic affinities of the Iranian bat fauna are calculated using the Index of Faunistic Congruence. The Iranian bat fauna is shown to be primarily of Palearctic origin and to have virtually no Oriental component.

All major bat-collecting localities in Iran are discussed, in detail where data is available, and faunal assemblages at each locality are discussed. External and cranial measurements of most bat specimens known from Iran are listed and a gazetteer to bat-collecting localities in Iran is included.

PREFACE

In 1962 and in 1968 the W. S. and J. K. Street Expeditions, sponsored by Field Museum of Natural History and the Iran Department of Game and Fish (now the Department of Environment), collected mammals at numerous localities in Iran. The goal of these expeditions was to document the occurrence and distribution of mammals in this zoogeographically important area. As a member of the 1968 Street Expedition, I gathered data on the occurrence, distribution, and ecology of bats in Iran and collected specimens for detailed taxonomic study. This paper presents the results of a portion of these efforts.

Several authors, including Blanford (1876), Misonne (1959), Lay (1967), and Etemad (1969), have summarized the species of bats known from Iran. However, none of these authors has presented a systematic evaluation based on external and cranial measurements of the specimens examined or has attempted a survey of all Iranian bats at the subspecies level. The large number of specimens collected by the 1962 and 1968 Street Expeditions now allows such detailed studies to be made. I have examined all specimens collected by these two expeditions, as well as numerous Iranian bats in the collections of other museums in the United States, Europe, and Iran. Although it is not yet possible to determine subspecific status of all bat specimens from Iran, and although many large gaps still are evident in our knowledge of the chiropteran distribution patterns in that country, I have been able to draw several conclusions on their subspecific status and probable distribution.

This paper presents a summary of all known locality records for Iranian bats and keys for the identification of all bat species now known to occur or thought likely to occur in Iran. Existing distribution records for Iran and surrounding nations are combined with environmental data from my own field observations and from the literature to predict the probable distribution of each species within

Iran. A discussion of the taxonomic problems relating to each species and subspecies is presented and, in most species, subspecies have been determined.

Ecological data from my observations, from the literature, and from personal correspondence and discussions with others have been summarized. These summarizations do not explain the ecology of Iranian bats as much as they illustrate how little is known about the life histories and behavior of these species.

I have attempted to summarize all that is known about the systematics, distribution, and ecology of Iranian bats. However, this monograph is by no means to be considered the last word. Instead, I hope this work will provide an impetus to studies that will fill in many of its very obvious gaps and deficiencies.

ANTHONY F. DEBLASE
Chicago, 1977

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1. INTRODUCTION

Previous Studies of Iranian Mammals

Several early authors reported small collections of mammals made in Iran (e.g., De Filippi, 1865), and in 1876 W. T. Blanford made the first attempt to summarize existing knowledge on the natural history of Iran in his book, *Eastern Persia, an Account of the Journeys of the Persian Boundary Commission 1870-71-72,* Vol. II, *The Zoology and Geology.* In this volume Blanford listed twelve species of Chiroptera for Iran. By modern taxonomic arrangement these 12 now represent 10 species. During the early part of the twentieth century several authors (e.g., Cabrera, 1901; Thomas, 1905, 1907; and Cheesman, 1921) added numerous species to the Iranian faunal list. Most of these authors reported specimens that had been collected by Col. A. C. Bailward, Col. J. E. B. Hotson, and other officers in the British Army and had been deposited in the British Museum (Natural History) in London. In 1921 Cheesman listed the mammals that had been reported from Iran since Blanford's (1876) work. By adding one bat, Cheesman brought the total number of species on the list of Chiroptera to 11.

During the 1930's and 1940's virtually no work was done on Iranian mammals, but in 1959 Misonne published *Analyse Zoogéographique des Mammiferes de l'Iran.* He listed 20 species of Chiroptera as having been reported from Iran, but one of these, *Pipistrellus nathusii,* was not based upon a specimen record. Of the remaining 19, 17 are presently recognized as full species.

Between 1962 and 1969 an Iranian mammalogist, Etemad (1963, 1964, 1967), and the reporters of two small collections made by universities in Great Britain (Harrison, 1963; Aberdeen University, 1965) recorded several species of bats new to the Iranian faunal list. During this same period, three major expeditions from American museums made collections of Iranian mammals.

In 1967 Lay reported the collections of the 1962 Street Expedition, the first of the three expeditions, and included 32 species of bats in his list of mammals known from Iran. As mentioned above, one of these, *P. nathusii,* was not based upon the report of actual specimens. A second, *P. mimus,* was based upon an early misidentification that has recently been corrected (Neuhauser and DeBlase, 1971). Omitting these reduces Lay's 32 species to 30. In 1969 Etemad reviewed all of the known records for Iranian bats and recognized the same 30 valid species listed by Lay (1967). The second major expedition was conducted by the U.S. National Museum in the early 1960's. This is a very large collection, but the bats are poorly represented, including only about 100 specimens representing 11 species, none of which is new to the Iranian faunal list.

In 1969 Farhang-Azad reported three species of Chiroptera new to the Iranian faunal list, but one of these (*Eptesicus ognevi*) is usually recognized only as a subspecies of a species already known from Iran (*E. bottae ognevi*). In 1970 Etemad reported another species new to the Iranian faunal list and thus brought the total number of bat species to 33.

In the late 1960's the Institute of Public Health Research and the World Health Organization established the Iran-WHO International Epidemiological Research Centre at the University of Tehran. In 1969 and 1970 teams from this organization made extensive surveys of the small mammal-borne diseases, and in 1970 and 1971 Dr. A. Farhang-Azad, team leader, prepared mimeographed reports of the preliminary results of these surveys and included lists of mammalian species collected. These collections include 556 bat specimens representing 21 species, none of which was new to the Iranian faunal list.

The third major museum expedition referred to above was the 1968 Street Expedition. Several papers resulting from studies based upon material collected by this expedition have included reports of species new to the faunal list: DeBlase (1971) — two new species; DeBlase (1972) — one new species; DeBlase et al. (1973) — one new species; and Neuhauser and DeBlase (1974) — one new species. These bring the number of bat species known from Iran up to 38.

Etemad (1973) reported an additional new species, but this monograph shows that this form should be considered conspecific with one already known from Iran. In addition, this monograph casts serious doubt on one of the earliest reported species (*P.

coromandra). Thus the total number of chiropteran species presently documented from Iran is 37.

Just as this was going to press I became aware of a specimen of *Myotis bechsteini* that had been collected in 1969, bringing the total number of bat species known from Iran back up to 38.

The 1968 Street Expedition

The 1968 Street Expedition collected mammals and their ectoparasites in western Iran from mid-July to mid-December of that year. The expedition was led by Mr. and Mrs. William S. Street and included a three-man scientific staff: Daniel Womochel, Richard Rust, and myself. Womochel and I were expedition mammalogists, responsible for prey and predaceous species respectively. Rust served as ectoparasitologist for the expedition. In addition to the American personnel, several Iranians served as members of our group. At least two representatives of the Iran Department of Game and Fish were with us at all times and assisted in locating specimens and in hunting.

Collecting Methods

Bats were taken at 39 different collecting sites between Maku, near the Soviet and Turkish borders in northwest Iran, and Minab, near the Strait of Hormoz at the west edge of Baluchistan. Several methods of collecting were used. At each of the major base camps used by the expedition, our interpreter and the representatives of the Iran Department of Game and Fish questioned people about the location of caves (*gara* in Farsi, the Iranian language) and about populations of bats (*kofash,* bats; or *chappareh,* any small fluttering creatures including butterflies and bats) in the area. Word was also passed that we would pay for specimens and pay to be led to caves, buildings, or other places where bats could be found. With the assistance of local guides, and independently, we searched for caves, *qanats* (underground irrigation tunnels), and buildings that contained signs of bat habitation. Mistnets were used across cave entrances, near buildings containing bats, across streams and irrigation ditches, and in wooded areas where bats were observed. Many specimens were collected with shotguns as they flew over streams and open areas.

When specimens were brought to camp for us to purchase, we offered additional remuneration to be led to the collecting site so that other specimens could be obtained and habitat data recorded. In caves and man-made structures bats were collected from accessible places by hand, from higher areas and from mid-air with a handnet, and from cracks and crevices with a pair of twelve-inch forceps. Specimens observed at inaccessible heights in caves were shot with a .22 pistol loaded with rat shot. Aerosol cans of insecticide were used to drive bats from some crevices and from the straw mats that provide the support for the tamped-clay roofs of many buildings.

Field Data Recorded

In addition to the locality and date for each specimen, data were recorded on the habitat, behavior, and reproductive condition of each individual. All specimens were searched for ectoparasites and six standard measurements (Total Length, Tail, Hind Foot, Ear, Tragus, and Forearm — explained in detail in Chapter 3) were taken with a millimeter rule from fresh specimens. Usually about half of the specimens of a species from one locality were prepared as standard study skins and skulls; the remainder were fixed in formalin and transferred later to ethanol. Carcasses preserved in spirit and postcranial skeletons were saved from some of the specimens prepared as dry skins. Mummified individuals, found on several occasions, were preserved intact.

Post-Expedition Study

After returning from Iran, I examined in detail the 610 bat specimens collected by the 1968 expedition and the 423 specimens collected by the 1962 expedition. In addition to external measurements taken in the field, I have since taken numerous cranial measurements of all dry specimens and, in certain groups, measurements of nasal ornamentation, phalanges, metacarpals, and other body dimensions (see enumeration in Chapter 3). All post-expedition measurements were taken with a Helios dial caliper. In addition to the Street Expedition collections and comparative material in Field Museum of Natural History, I have examined Iranian and comparative material in the following collections (an asterisk [*] indicates that Iranian bats are included in the collection):

AKP	A. Kuzyakin Personal Collection, Moscow, USSR
BM	*British Museum (Natural History), London, England
FMNH	*Field Museum of Natural History, Chicago, Illinois, USA

HZM	Harrison Zoological Museum, Sevenoaks, England
IPHR	*Iran Public Health Research collections, University of Tehran, Tehran, Iran
MMTT	Muze-ye Melli-ye Tarikh-e Tabi'i (National Museum of Natural History), Tehran, Iran
MZST	*Museum and Institute of Zoological Systematics, University of Torino, Turin, Italy
NMV	*Naturhistorisches Museum, Vienna, Austria
OSU	Oklahoma State University Museum, Stillwater, Oklahoma, USA
SMF	Senckenberg Natur-Museum, Frankfort am Main, West Germany
SMNS	*Staatlichen Museum für Naturkunde, Stuttgart, West Germany
UIM	*University of Illinois Museum, Urbana, Illinois, USA
UMM	*University of Michigan Museum, Ann Arbor, Michigan, USA
USNM	*National Museum of Natural History, Washington, D.C., USA
ZMAS	*Zoological Museum, Academy of Science, Moscow, USSR
ZMMU	Zoological Museum of Moscow University, Moscow, USSR

Acknowledgments

This monograph is based primarily upon the specimens collected and data gathered by the 1962 and 1968 W. S. and J. K. Street Expeditions to Iran. I would like to thank Field Museum of Natural History and the Iran Department of Game and Fish (now the Department of Environment), co-sponsors of the 1968 expedition, for making it possible for me to participate in that expedition and for allowing me the facilities to conduct this study.

I am particularly grateful to William S. and Janice K. Street, the leaders of the expedition; Daniel R. Womochel and Richard W. Rust, the other two scientists who participated in the expedition; and Youton Bottaloff and the other Iranians on our expedition staff. All of these persons provided valuable assistance in all phases of the field work and made the expedition an unforgettable experience.

Joseph Curtis Moore, former Curator of Mammals at Field Museum, co-ordinated the expedition from the United States and provided advice during several phases of this study. Luis de la Torre,

Ronald Turner, and Patricia Freeman, subsequent Curators of Mammals at Field Museum, made the resources of their division available to me and I am grateful for this co-operation.

Special thanks are due Eskandar Firouz, former Assistant Prime Minister and Director of the Iran Department of Environment; Jerry Hassinger, former Leader of the Terrestrial Wildlife Unit; Robert Tuck, former Advisor to the Muse-ye Melli-ye Tarikh-e Tabi'i; and the entire staff of the Iran Department of Environment for the invaluable assistance they rendered in expediting a myriad of problems prior to, during, and since the expedition. The chiefs of the various district Game and Fish offices provided assistance in numerous ways during our stays in their respective territories and provided members of their staff to assist us in searching for and collecting specimens.

During the expedition several persons not affiliated with the Iranian government provided valuable assistance. I would like to thank the organization CARE, particularly Frank Goffio, Director, and Henry Selz, former Chief of the Iran Office, for their valuable assistance in Tehran; the Red Lion and Sun organization for generously providing the expedition with warehouse space; and Dr. Limatainen, Science Attache at the U.S. Embassy in Tehran, and Dr. Mahmoud Bahmanyar of the Institut Pasteur de l'Iran, for their advice and assistance.

I am grateful to David L. Harrison, HZM, for his assistance and comments on several problems, and for providing access to his collections of southwest Asian mammals; to J. Edwards Hill, BM, for assistance with specific problems, and for allowing me to use the collections of the British Museum (Natural History); and to Douglas M. Lay, UMM; A. Farhang-Azad, IPHR; and Henry W. Setzer, USNM, who generously allowed me to study unreported specimens in the collections under their supervision. I also thank Alexander Kuzyakin, AKP; Orsetta Elter, MZST; F. Dieterlen, SMNA; Phillip Myers, UMM; Donald Hoffmeister, UIM; and Olga Rossolimo, ZMMU; for allowing me to examine specimens in their care, and Heinz Felten, SMF, for providing me with data on specimens recently collected in Iran.

Bryan P. Glass, Stephen R. Humphrey, Hans N. Neuhauser, Duane A. Schlitter, David L. Harrison, Karl F. Koopman, and Jiri Gaisler offered encouragement, comments, and criticisms on several points in this study; William Delavari gave generously of his time to translate portions of Etemad's (1969) *Bats of Iran* from Farsi to English; and William and Janice Street provided funds for the publication of this volume. I am grateful for their assistance.

A final and extra special thanks goes to my late wife, Alyce, who not only tolerated all of the problems involved in a study of this sort, but was my valued assistant at each step of the study and manuscript preparation.

To all those listed above and to many others in Iran, Chicago, and other parts of the world who have contributed to this study, I extend a sincere and heartfelt thanks.

2. THE LAND OF IRAN

Iran, the largest country in southwest Asia, covers an area of approximately 628,000 sq. miles from 25°N to 40°N latitude and from 44°E to 63°E longitude (fig. 1). It is about three times the size of France or roughly equal in area to the United States east of the Mississippi River.

The Iranian nation, formerly known as Persia, is bounded on the south by the Gulf of Oman and the Persian Gulf. Between these two gulfs, at the Strait of Hormoz, it is less than 60 km. from Iran to the tip of the Arabian Peninsula. On the peninsula across the gulf from Iran are Oman, Saudi Arabia, Kuwait, Qatar, Bahrain, and the United Arab Emirates. To the west, Iran borders on Iraq and Turkey. To the north lie the USSR and the Caspian Sea, with Armenia SSR and Azarbaijan SSR bordering Iran west of the Caspian and Turkmeniya SSR sharing the frontier east of the Caspian. On the east Iran borders Afghanistan and Pakistan.

Several names that frequently appear in the literature refer to areas that extend into Iran but have no distinct political boundaries (fig. 2). **Mesopotamia** is the area of the ancient civilizations of the fertile crescent. The Khuzistan Plain represents Mesopotamia in Iran. **Kurdistan** is the area of the Zagros Mountains inhabited by the Kurdish people and is today divided among three nations: Iran, Iraq, and Turkey. **Armenia** is also an ancient nation that is today incorporated into three nations: Iran, Turkey, and the USSR. **Turkestan** is a general term for the central Asian steppes and, in Iran, is represented only by the Turkmen Steppe. **Seistan** refers to the Seistan Basin and primarily the area around Seistan Lake. Today Seistan lies partly in Iran and partly in Afghanistan. **Baluchistan** is the extensive, rugged desert area of southeastern Iran and western Pakistan. The **Mekran Coast** is an old name for the coastal strip along the Mekran Range in Iran and Pakistan.

Several recent authors have dealt with Iran as a geographical

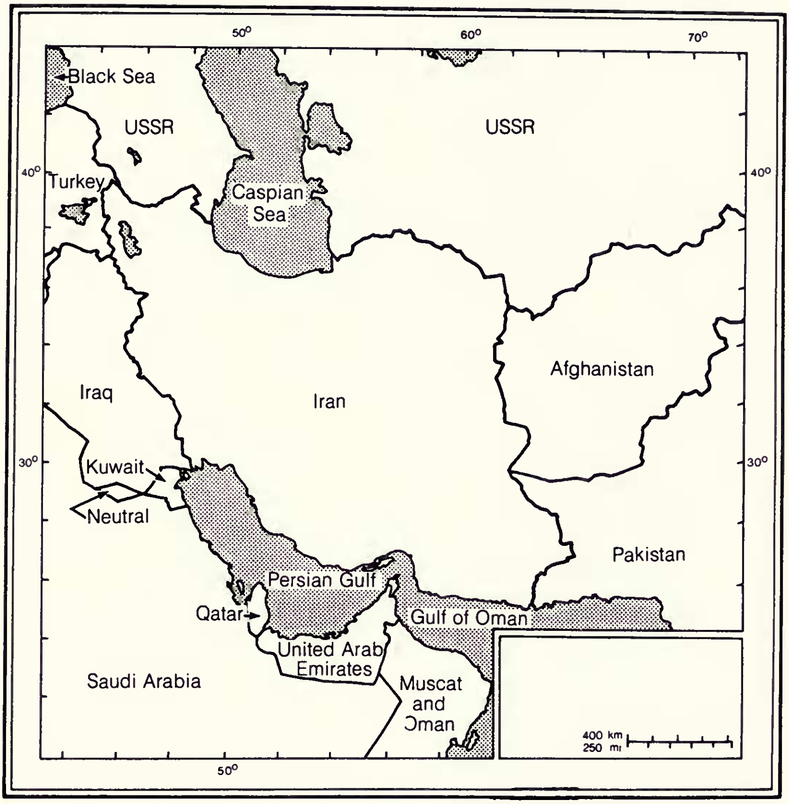

FIG. 1. Iran and adjacent nations.

unit. Misonne (1959), Lay (1967), Firouz (1974) and Womochel (unpublished manuscript) have described the physiography, climate, and vegetation of Iran as these relate to mammalian distribution. Of a more comprehensive nature, *The Cambridge History of Iran,* Volume I: *The Land of Iran* (1968), edited by W. B. Fisher, presents detailed accounts of the physical geography, geology, climate, soils, hydrography, vegetation, and other characteristics of this country. I will present here only a brief sketch of the physiography, climate and vegetation.

Physiography

Iran occupies the western two-thirds of the Iranian Plateau, a geographic unit that arises in the Armenian Knot at the east end of

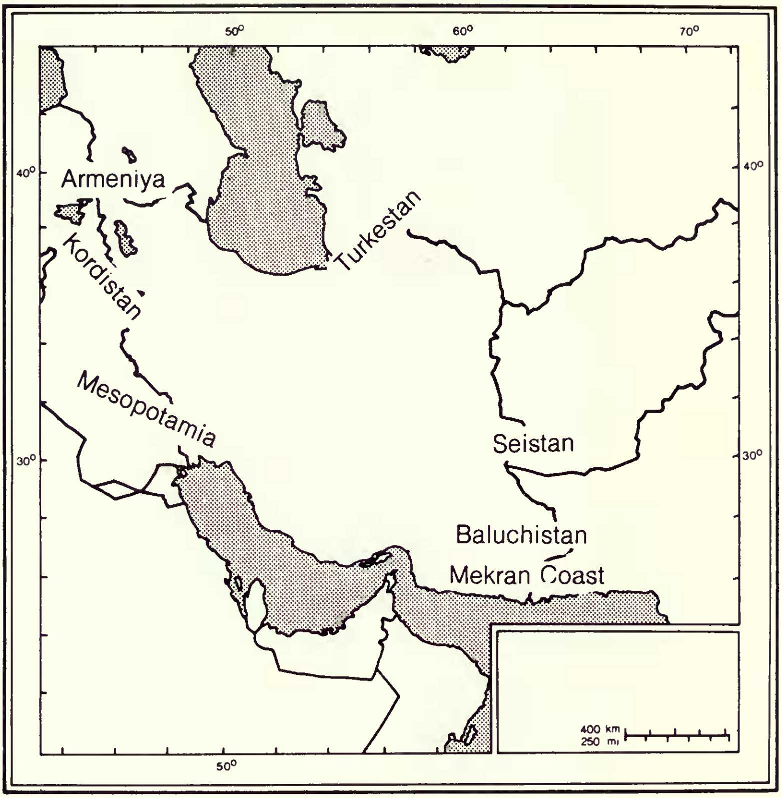

FIG. 2. Geographic regions lacking precise boundaries and extending into Iran.

the Anatolian Plateau of Turkey, expands southward to include most of Iran, Afghanistan, and Pakistan, and constricts again at the Pamir Knot at the west edge of the Tibetan Plateau. To the south the Iranian Plateau is bordered from east to west by the Indus Valley, the Arabian Sea, the Gulf of Oman, the Persian Gulf, and the Mesopotamian Plain. To the north the Plateau is bordered by the Caucasus Mountains (sometimes considered a portion of the Iranian Plateau), the Caspian Sea, and the steppes of the central USSR. The plateau consists of series of mountain ranges on the periphery and several basins in the interior. The major physiographic features of Iran are shown in Figure 3.

The Zagros Mountains extend diagonally from Mt. Ararat in eastern Turkey (just across the extreme northeast border of Iran) south

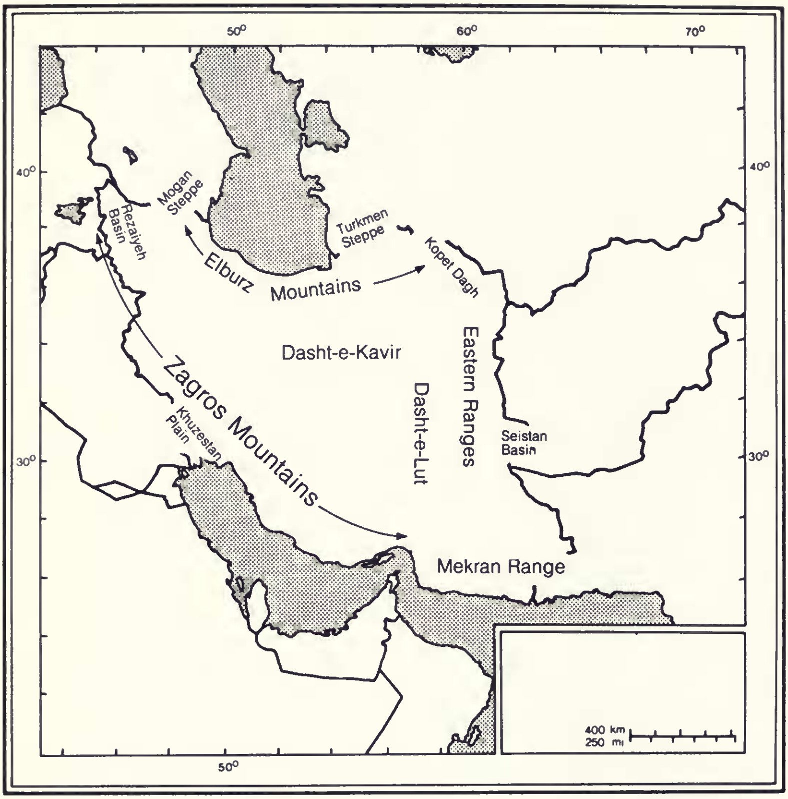

FIG. 3. Major physiographic features of Iran.

and east to the vicinity of the Strait of Hormoz. In the north these mountains are primarily fault blocks, and Mt. Ararat in Turkey and Mt. Sabalan in northwest Iran are two principal volcanic cones in this area. Farther south the Zagros become a series of parallel folds that together range up to 322 km. in width (Lay, 1967, p. 13). Kuh Rang, at 4551 m. one of Iran's highest peaks, is in this folded area (fig. 4). Still farther south the ridges decrease in height, but elevations of 3046 m. and above are still common (Lay, 1967, p. 13). The Mekran Range extends from the south end of the Zagros system (and is considered a portion of it by some authors) and continues east through Iranian and Pakistani Baluchistan to the Indus Valley. The Mekran Range is lower in elevation than the Zagros and is much more dissected.

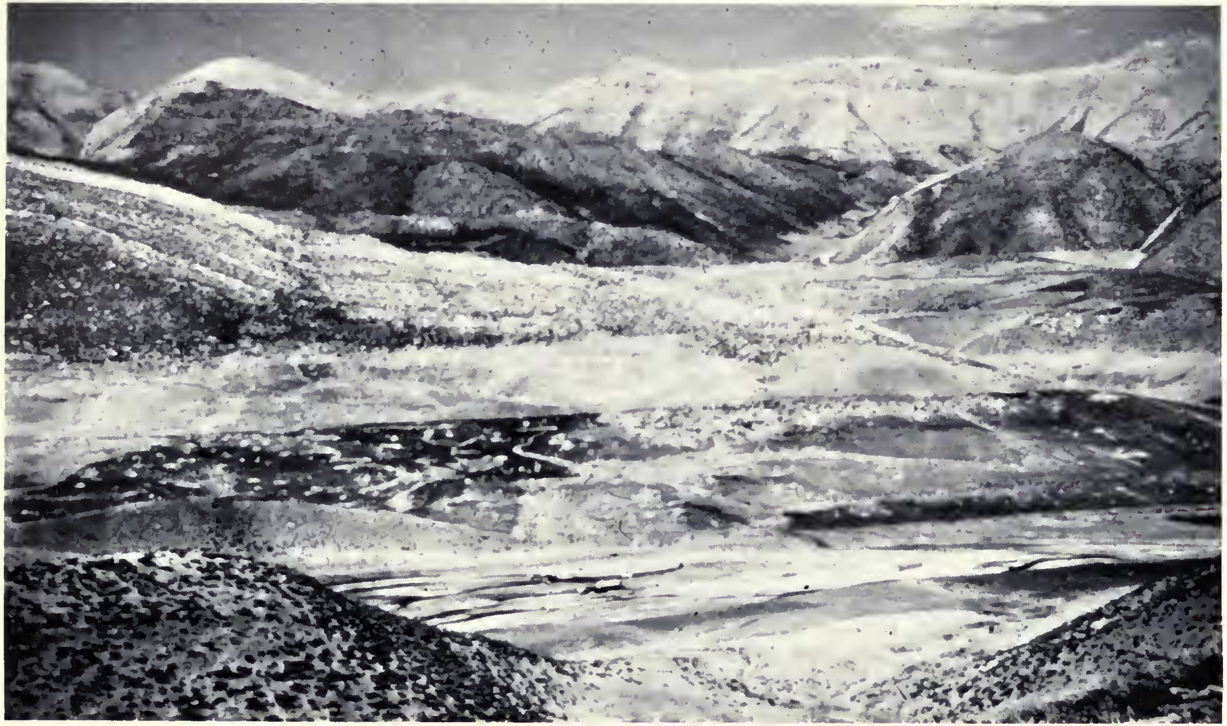

FIG. 4. The Kuh Rang range, near the center of the Zagros Mountain range. The camp in the valley is at approximately 2,590 m. elevation.

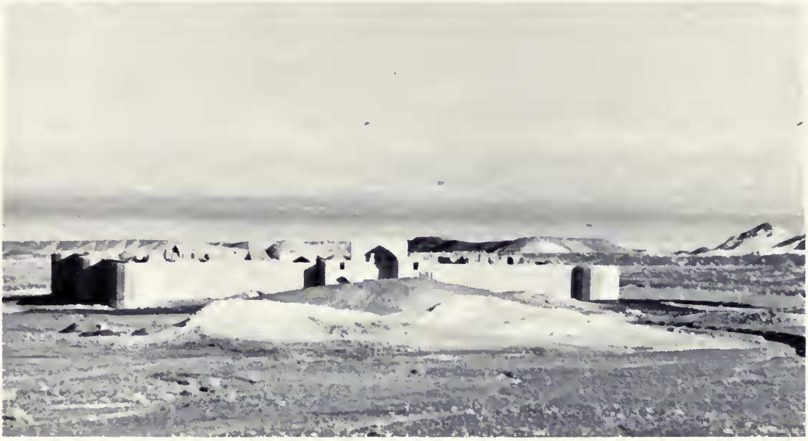

FIG. 5. Mt. Demavend, Iran's highest peak, protrudes above the rest of the Elburz Mountains and is visible from well into the Dasht-i-Kavir.

The Elburz Mountains arise in northwestern Iran and arc around the southern end of the Caspian Sea. Mt. Demavend, at 5784 m. Iran's highest peak, lies near the center of this system (fig. 5). East of the Caspian, the Kopet Dagh mountains cross the border from Soviet Turkestan, join the Elburz, and extend east to the Afghanistan border. The Eastern Ranges form a series of small mountain ranges that run from north to south in eastern Iran and separate the two major basins on the Iranian Plateau.

The Iranian Basin is a large, roughly triangular depression flanked by the mountain ranges listed above. Within it are the two large central deserts of Iran. The Dasht-i-Kavir, the northernmost of the two deserts, is an extensive area of salt flats and pebble pavement (fig. 5). The Dasht-i-Lut, the southern desert, contains extensive areas of windblown sand. The Seistan Basin lies east of the Eastern Ranges, mostly in Afghanistan, and within the basin Seistan Lake straddles the Iran-Afghanistan border. The Rezaiyeh Basin lies in northwestern Iran in the Zagros Mountains. It is considerably smaller than either the Iranian or Seistan Basin, but it contains Lake Rezaiyeh (formerly Lake Urmiah), the largest lake in Iran (fig. 6).

The Khuzistan Plain (fig. 7), the only extensive lowland area

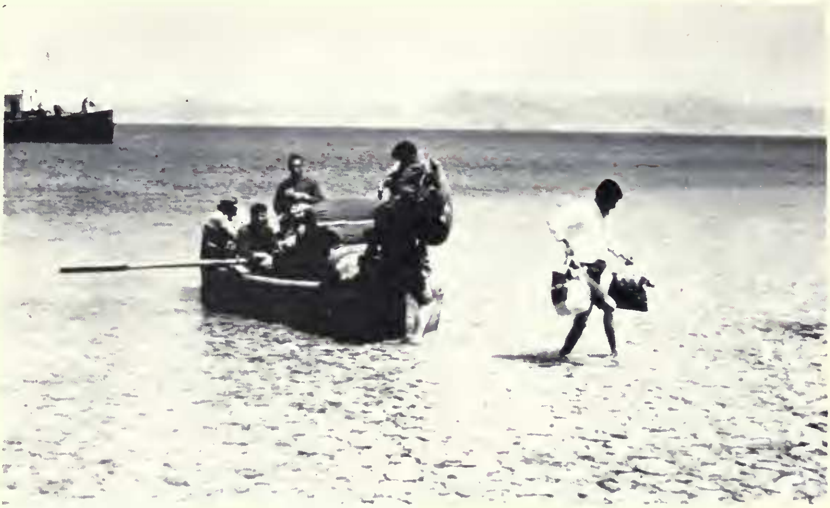

FIG. 6. Lake Rezaiyeh, Iran's largest lake, lies at the bottom of the Rezaiyeh Basin. The salinity is very high and the feet of these waders were encrusted with salt upon drying. This view is from one of the numerous islands to the closest shoreline.

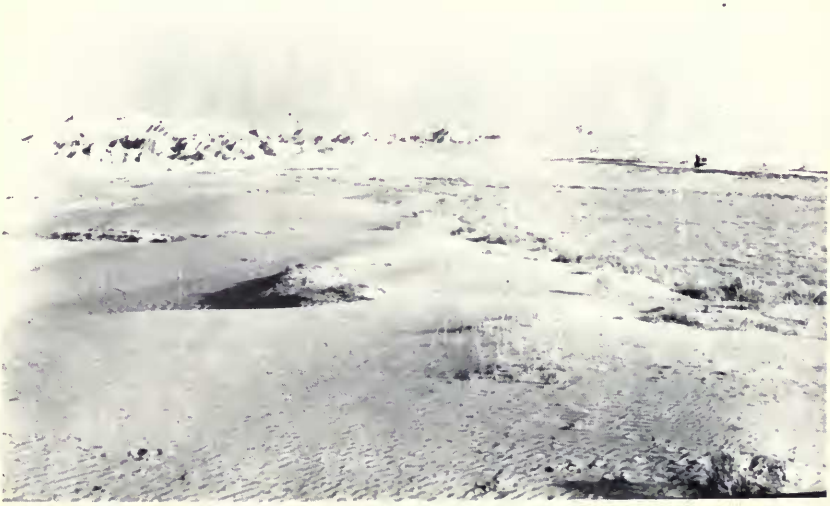

FIG. 7. Sand dunes at the edge of the Khuzistan Plain.

within the political boundaries of Iran, lies southwest of the Zagros Mountains at the head of the Persian Gulf. Geographically, this area is a part of the Mesopotamian lowland. A narrow southern coastal plain extends from the Khuzistan Plain to Pakistan between the Zagros Mountains and the Persian Gulf and between the Mekran Range and the Gulf of Oman. Several small islands, mainly in the Strait of Hormoz, are a part of the Iranian state.

The Caspian Coastal Plain is a narrow strip ranging from 1 to 30 km. in width and lying between the Caspian Sea and the Elburz Mountains. The present level of the Caspian Sea is about 34 m. below sea level, and much of the Caspian Coastal Plain is also below sea level. The Turkmen Steppe is a small portion of the central Asian steppes that extends into Iran from across the Soviet border east of the Caspian, north of the Elburz, and southwest of the Kopet Dagh. The Moghan Steppe, which penetrates into Iran for a short distance, is a portion of the Aras River valley in Soviet Azarbaijan.

Climate

The major feature in the climate of most of Iran may be summed up in one word: "dry." Only the northern slope of the Elburz Mountains, the adjacent Caspian Coastal Plain, and some of the highest peaks in the Zagros Mountains receive a mean annual precipitation of 600 mm. or more. On the Caspian coast this average ranges up to 1800 mm. per year. In general, the northern and western portions of the country receive considerably more precipitation than those in the south and east. The average in the central Zagros ranges from 400 to 800 mm. per year; most of the areas of the northern and southern Zagros and the southern slope of the Elburz receive between 200 and 400 mm. of precipitation per year. The remaining areas receive an average of less than 200 mm.

Only the Caspian coast and northern slope of the Elburz receive a significant amount of precipitation during the summer. Most of the rest of the country has essentially no rainfall during the summer months and most precipitation occurs during the winter.

Iran can be divided into five zones on the basis of temperature. The northern slope of the Elburz Mountains, the Caspian Coastal Plain, and the Turkmen Steppe are characterized by a low annual temperature range, with relatively cool summers and relatively warm winters. The Khuzistan Plain and southern coastal strip have

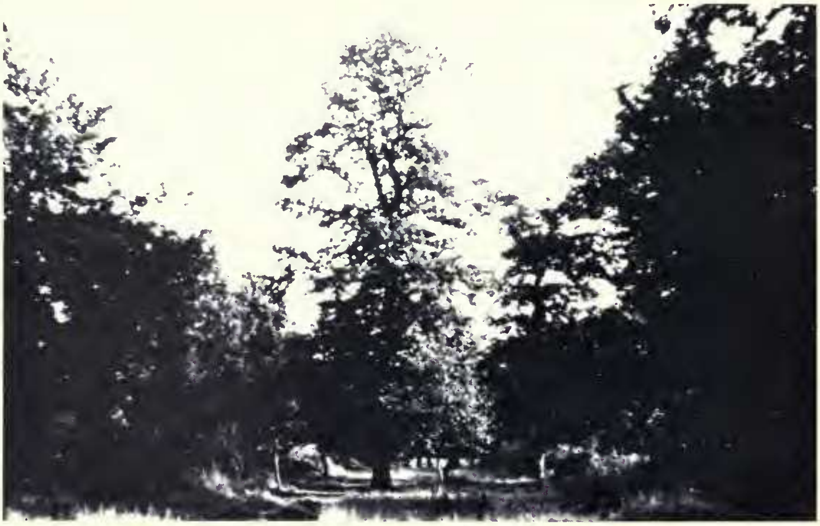

FIG. 8. Deciduous forest at Dasht-e-naz Fallow Deer Park on the Caspian Coastal Plain near Sari.

the highest temperatures, with both the January and July means ranging from 4° to 10° C above the other areas. The Zagros Mountains and northwestern Iran have a very low January mean and the August highs are much lower than those of other regions. The southern slope of the Elburz Mountains and most of northeastern Iran have temperatures similar to the Zagros Mountains, but have hotter summers and a wider annual temperature range. The central deserts and the Baluchistan area have the greatest range of temperature and, except for the Khuzistan Plain and southern coast, the hottest July averages.

The above climatic data is summarized from Ganji (1968).

Vegetation

As is indicated by the preceding information on climate, the major feature of the Iranian habitat is aridity; therefore, forests are found only in a few restricted areas. The northern slopes of the Elburz Mountains and the Caspian Coastal Plain have a lush deciduous forest (fig. 8). Throughout the northern two-thirds of the Zagros Mountains, scattered remnants of stunted oak forests provide evi-

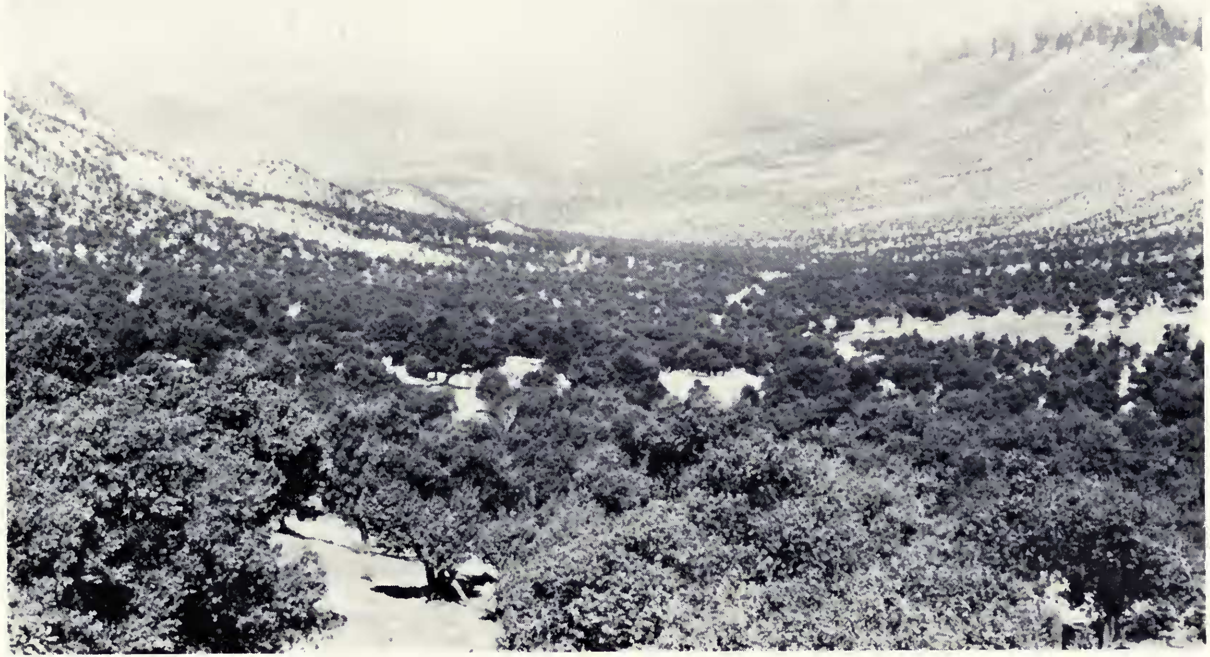

FIG. 9. Widely spaced oaks in a remnant "forest" near Ilam.

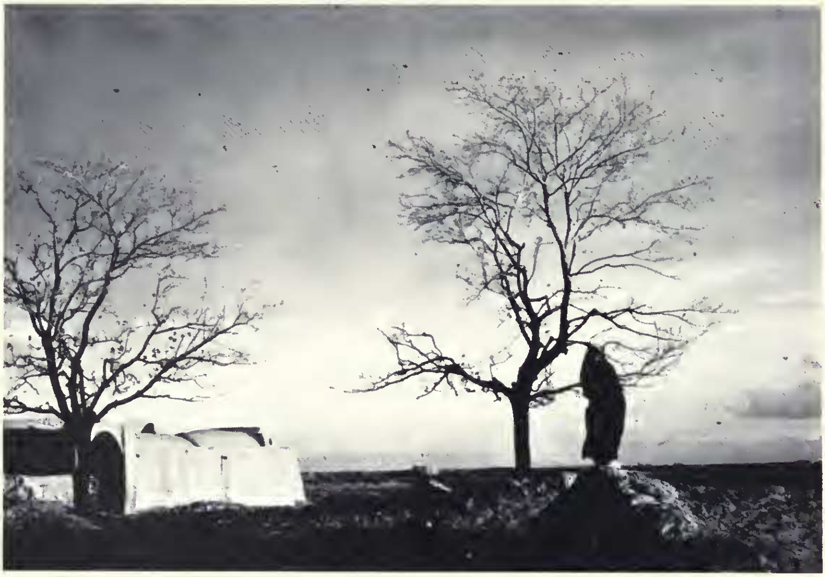

FIG. 10. Pistachio trees in December at the edge of a village near Sa'idabad.

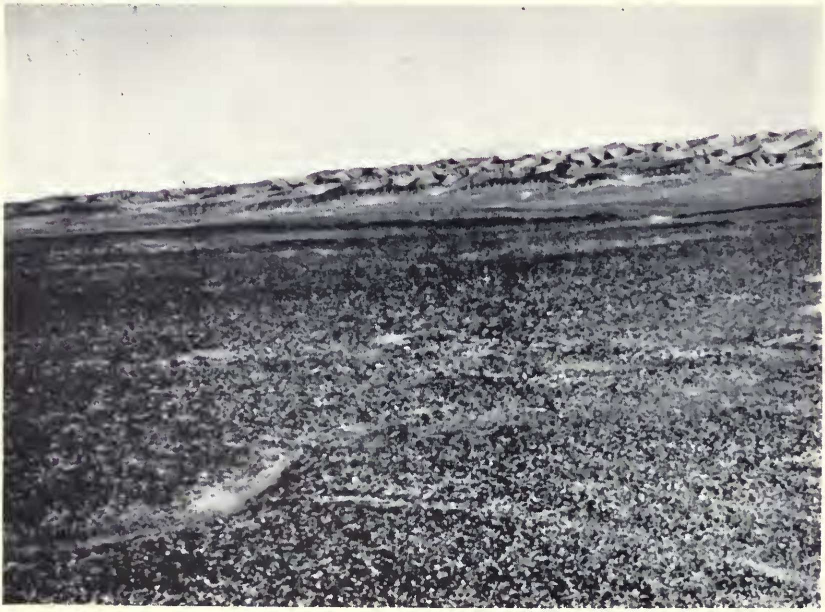

FIG. 11. Pebble pavement of the Dasht-i-Kavir north of Yazd.

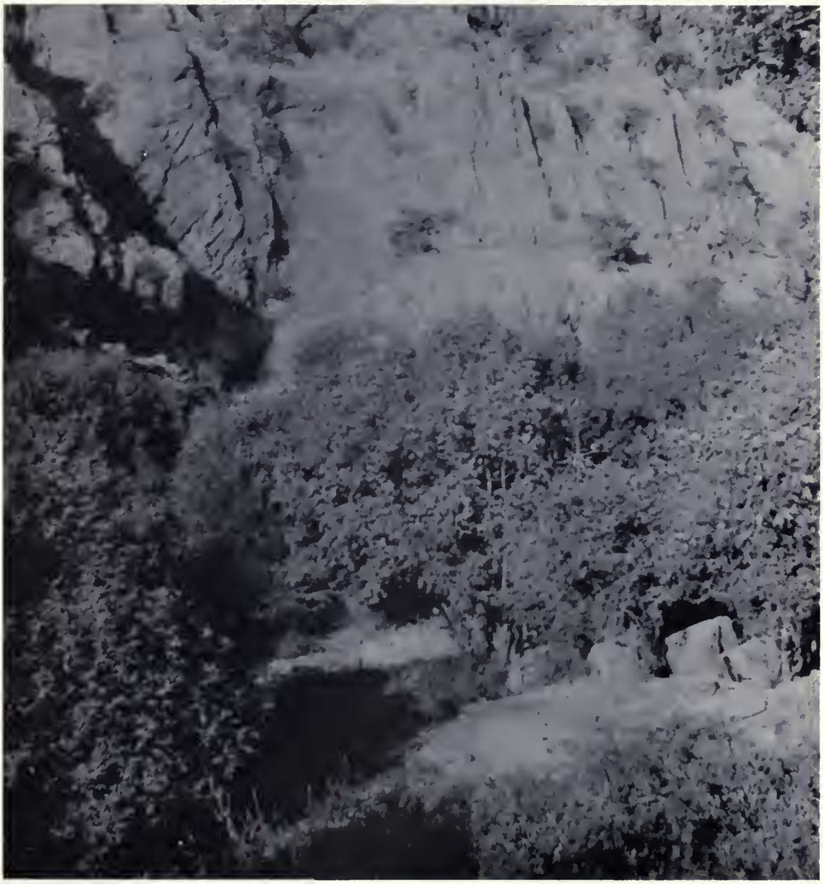

FIG. 12. Riparian deciduous vegetation in a sheltered canyon near Yasoodj in the southern Zagros Mountains.

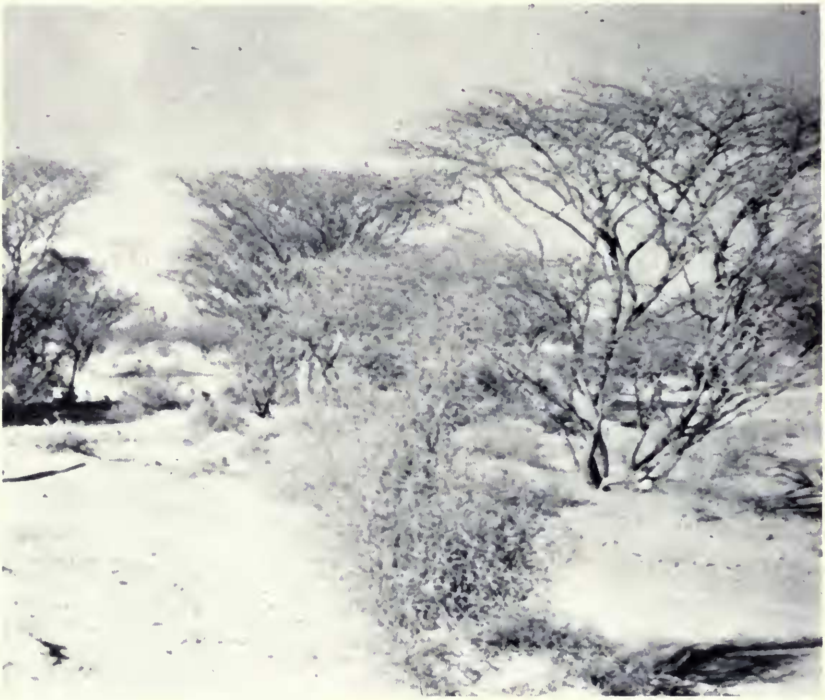

FIG. 13. Acacias on the Persian Gulf coastal strip near Chah Moslem.

dence that these mountains once were completely forested. However, except in the most inaccessible regions, centuries of disturbance by humans and their domestic animals have reduced these forests to scattered remnants (fig. 9). A second type of dry forest, the pistachio-almond-maple forest, once covered the more elevated portions of the interior, particularly along the southern slope of the Elburz and the eastern slope of the Zagros. Today, however, most of this forest is gone except in the southern Zagros and eastern Elburz. Thin stands of pistachio and almond still occur on some higher elevations scattered through the interior (fig. 10). Most of the interior of Iran varies from *Artemisia* steppe through various steppe and desert complexes to expanses of completely barren ground (figs. 5 and 11).

In sheltered valleys in the Zagros and on the southern slope of the Elburz, and along major rivers near the mountains in the interior, riparian forests of maple, elm, walnut, mulberry, plum, and several other deciduous species may be found (fig. 12).

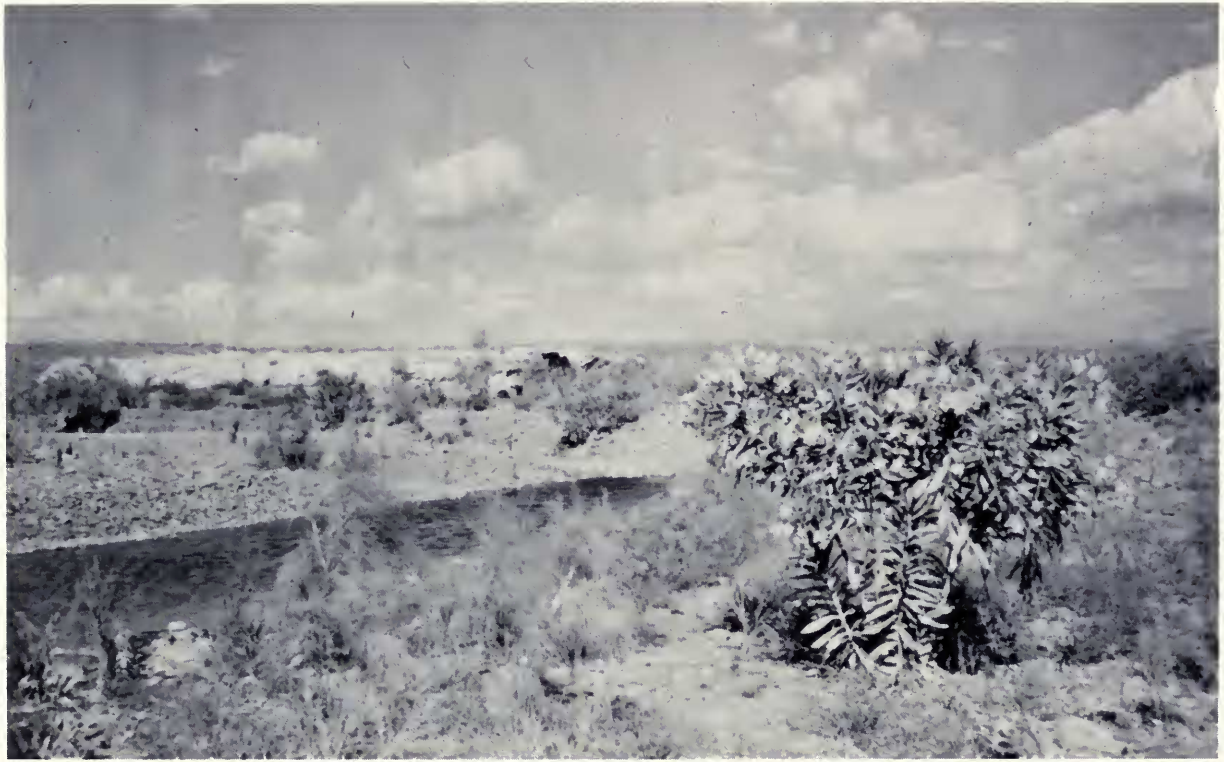

FIG. 14. Tamarisk and oleander near a stream on the Mekran Coast southeast of Minab.

In the southern part of the country the vegetation is more similar to that of the Sahara and India and includes species such as acacia, kunar tree and dwarf palm (fig. 13). In this area riparian vegetation is primarily tamarisk, myrtle, and oleander (fig. 14). Mangrove forests occur in small patches along the southern coast, particularly in the areas of the Strait of Hormoz.

The above information on vegetation is summarized from Bobek (1968). For an even more detailed presentation of the Iranian vegetation, see Zohary (1963).

3. EXPLANATORY NOTES

Taxonomic Characters of Chiroptera

Several external anatomical features are important in the classification and identification of bats. The length and shape of external ear pinna of bats can vary considerably, as can the length and shape of the tragus, a flap that protrudes from the lower, inner margin of the pinna (fig. 15A-C). Two bat families occurring in Iran lack a tragus. In the Rhinolophidae the antitragus, a flap protruding from the lower outer margin of the pinna, is well developed (fig. 15D), but in the Pteropodidae both the tragus and antitragus are absent, and the inner margin of the pinna is unbroken by flaps or indentations (fig. 15E).

The nose of most Iranian bat species lacks any flaps or other ornamentation (fig. 16A). Some species have a simple flap or ridge protruding dorsally from an otherwise plain nose (fig. 16B) and others have a very elaborate and complex arrangement of flaps and ridges above and around the nose (fig. 16C).

The bat wing (fig. 17) varies little in the presence or absence of components. The Pteropodidae usually retain a claw on the second manual digit, and the number of phalanges on this digit can vary from zero to two in the microchiropteran families. Although there is little variation in the presence or absence of wing elements, these

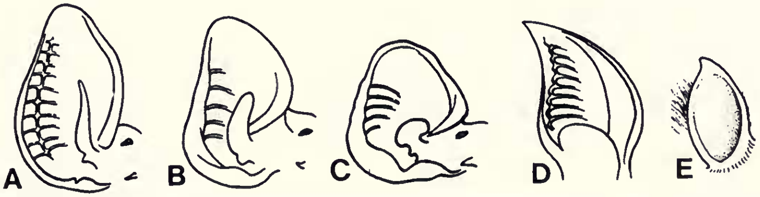

FIG. 15. Representative bat ears. **A, B, C,** representative Vespertilionidae; **D,** Rhinolophidae; **E,** Pteropodidae (DeBlase and Martin, 1974). Not all to same scale.

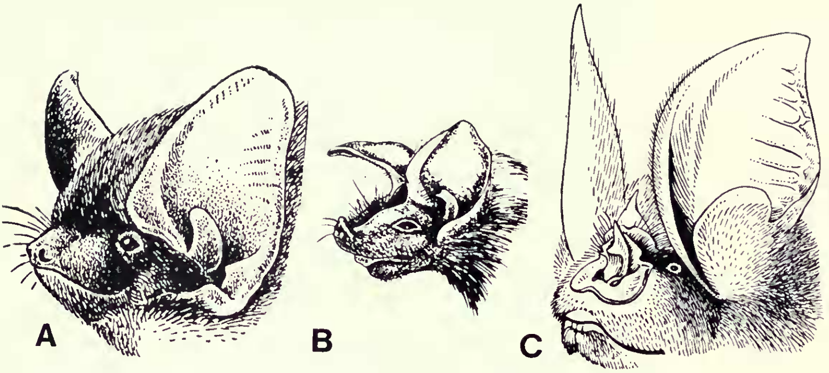

FIG. 16. Representative nasal ornamentation. **A,** plain nose of *Pipistrellus* (Kuzyakin, 1950); **B,** simple noseleaf of *Rhinopoma* (Harrison, 1964); **C,** complex noseleaf of *Rhinolophus* (Gromov, 1963). Not all to same scale.

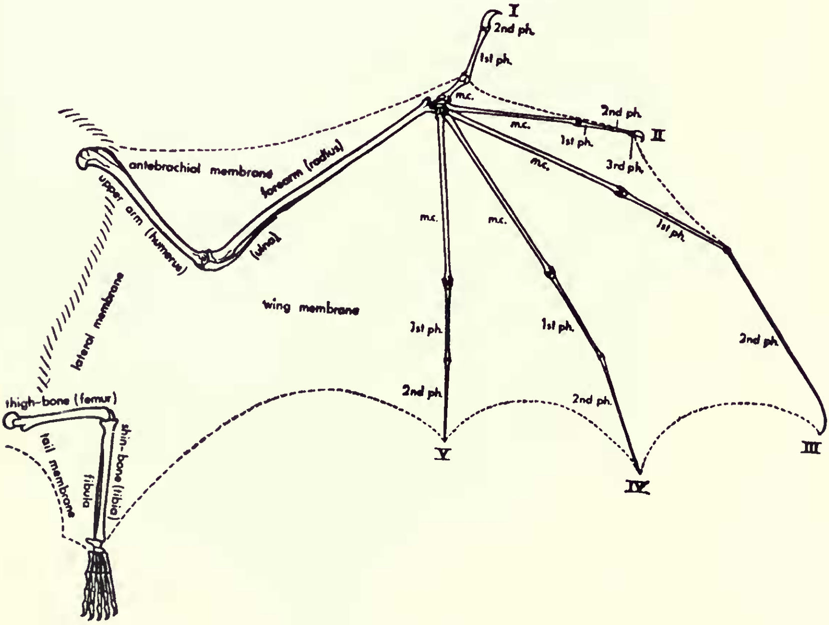

FIG. 17. Structure of a bat's wing (Rosevear, 1965).

can vary greatly in relative size and proportion. Thus the relative lengths of various metacarpals and phalanges can be important taxonomic characters.

Unlike the wing, the bat tail and uropatagium, the web of skin extending between the hind legs, varies considerably among families. The Iranian Pteropodidae have a very short tail and a rudimentary uropatagium. In both the Rhinopomatidae and Molossidae the tail is very long but the uropatagium is short (fig. 18A, B), so that a length of tail extends beyond the posterior margin of the uropatagium. In the Rhinolophidae and Vespertilionidae both the tail and uropatagium are relatively long, and the tail is entirely or almost entirely enclosed with the uropatagium (fig. 18C). The Iranian Emballonuridae have a long uropatagium and a relatively well developed tail, but only the basal half of the tail is enclosed within the uropatagium. The tail then protrudes from the dorsal surface of the uropatagium and the distal half of the tail is free (fig. 18D).

The length of the hindfoot, the point at which the wing membrane attaches to the leg, and the presence or absence and length of the calcar, the cartilaginous spur that protrudes into the hind edge of the uropatagium from the heel, are all frequently used as taxonomic characters.

The color of Iranian bats can range from pale buff or yellow through various shades of red, brown, and grey to black on the dorsal surface. All of these colors as well as white are found on the ventral surface. It is difficult to describe colors so that a reader will know the tint, hue, and intensity described; therefore, frequent references are made to various color standards. Three such color manuals are used in this monograph. These are Ridgway (1912), *Color Standards and Color Nomenclature;* Maerz and Paul (1950), *A Dictionary of Color;* and Villalobos-Dominguez and Villalobos (1947), *Colour Atlas.* Whenever the names of colors are capitalized in this monograph they refer to standardized colors of Ridgway (1912).

The bat skull contains most of the major features used in taxonomy and identification. It is important to determine whether or not various bones or portions of bones, such as the premaxilla, and certain structures, such as the postorbital process, are present. Also important in classification and identification are the shape and size of the skull, as illustrated by the several standard cranial measurements (see below).

With the exception of *Rousettus,* which eats fruit, all Iranian bats

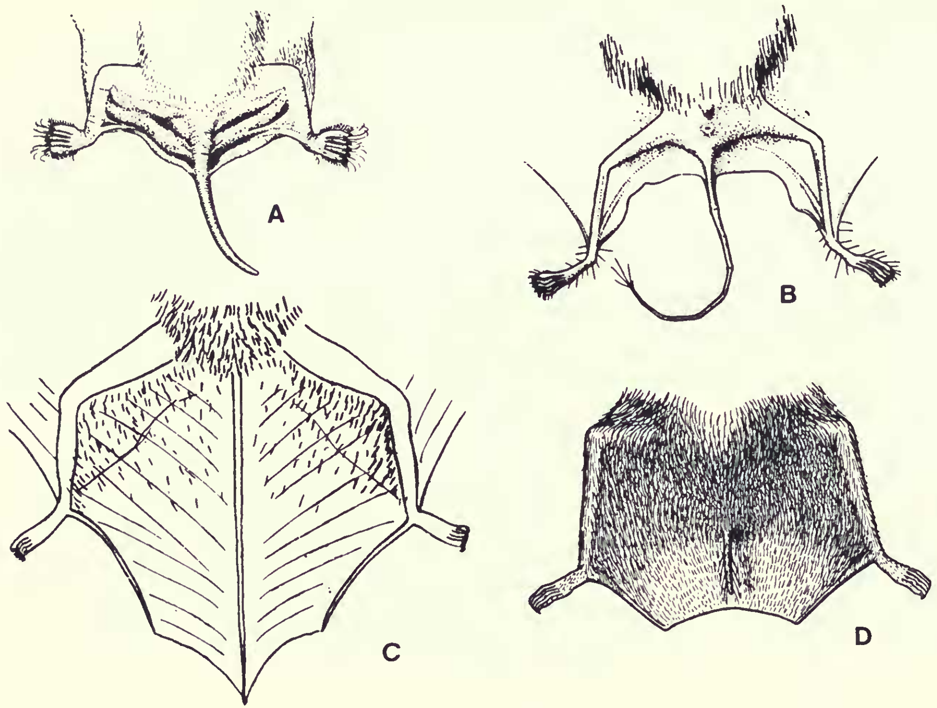

FIG. 18. Representative bat tails and tail membranes. **A,** "free-tail," Molossidae; **B,** "mouse-tail," Rhinopomatidae (DeBlase and Martin, 1974); **C,** enclosed tail, Vespertilionidae (Panouse, 1951); **D,** "sheath-tail," Emballonuridae (Rosevear, 1965). A and D dorsal views, B and C ventral views.

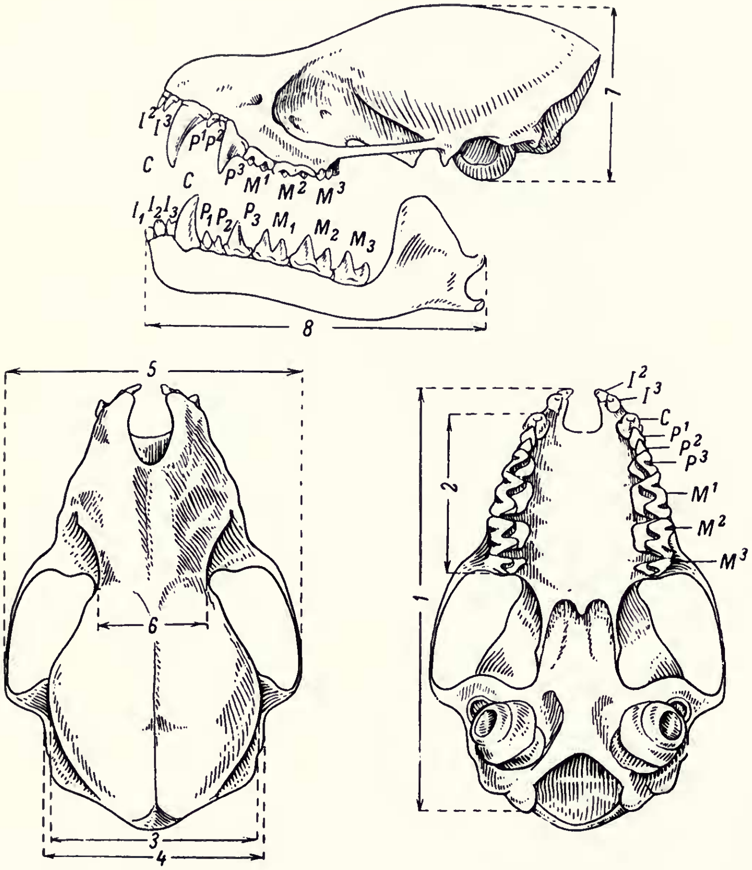

FIG. 19. Tooth numbers and cranial dimensions of a bat skull. Teeth: I = incisor; C = canine; P = premolar; M = molar. Dimensions: **1,** condylobasal length, CBL; **2,** maxillary tooth row, $C\text{-}M^3$; **3,** mastoid breadth, MB; **4,** breadth of braincase, BB; **5,** zygomatic width, ZW; **6,** interorbital width, IO; **7,** height of braincase, BH; **8,** greatest length of mandible, ML (Gromov, 1963).

are insectivorous. However, the presence or absence of various teeth, particularly incisors and premolars, is an important variable, as is the relative size and configuration of the teeth that are present. The incisors, canines, premolars, and molars of a bat are identified in Figure 19. The notation for teeth used in this illustration (e.g., P^2 for second upper premolar and M_1 for first lower molar) will be used throughout this monograph.

Measurements

The abbreviations listed below are used for measurements taken from specimens and from the literature. Unless otherwise noted, all external measurements were taken by me or from the specimen tag, and all cranial measurements were taken by me with Helios dial calipers. All measurements of specimens are given in millimeters.

EXTERNAL MEASUREMENTS

TL	Total Length. Taken from the tip of the nose to the posterior tip of the last tail vertebra.
HB	Head and Body Length. Determined, for our specimens, by subtracting Tail Length from Total Length.
T	Tail Length. With tail bent up at a right angle to the body, measured from the angle to the tip of the vertebra.
HF	Length of Hind Foot. From the posterior edge of the heel (calcaneum) to the end of the longest claw. Unless otherwise indicated by "su," all Hind Foot measurements presented in this paper include the claw, "cu."
E	Length of Ear. From notch to tip.
Tr	Length of Tragus. From base to tip.
FA	Length of Forearm. From elbow to wrist, including wrist bones, with wing folded.
D4 P1	Length of First Phalanx of Fourth Manual Digit.
D4 P2	Length of Second Phalanx of Fourth Manual Digit.
3 Met	Length of Metacarpal of the Third Manual Digit.
5 Met	Length of Metacarpal of the Fifth Manual Digit.
HW	Width of Horseshoe. Measured at widest point.

CRANIAL MEASUREMENTS

BB	Breadth of Braincase. Measured just behind the posterior root of the zygomatic arch (fig. 19[4]).
CBL	Condylobasal Length. From anterior edge of incisive alveoli to posterior projection of the occipital condyles (fig. 19[1]).
CCL	Condylocanine Length. From the anterior edge of the canine alveoli to the posterior projection of the occipital condyles.
C-M^3	Maxillary Tooth Row. From the anterior edge of the

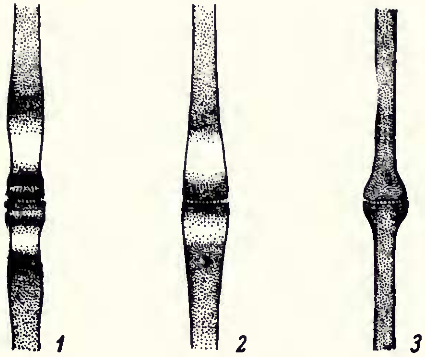

FIG. 20. Ossification of the epiphyses of wing bones in three ages of bats. **1** and **2**, partial ossification in younger and older immature specimens; and **3**, full ossification in an adult (Gromov, 1963).

	canine alveolus to posterior edge of alveolus of the last molar (fig. 19[2]).
C-M_3	Mandibular Tooth Row. From anterior edge of canine alveolus to posterior edge of alveolus of last molar.
GLS	Greatest Length of Skull. Greatest length of skull including teeth.
IO	Interorbital width. Least width across the constriction between the orbits (fig. 19[6]).
M^3-M^3	Palate width at M^3. Distance between the inner edges of the alveoli of the last molars.
MB	Mastoid Breadth. Greatest breadth across the mastoid processes (fig. 19[3]).
ML	Greatest Length of Mandible. Self-explanatory (fig. 19[8]).
PO	Postorbital width. Least width across the postorbital constriction.
TBL	Greatest Length of Tympanic Bullae. Self-explanatory.
ZW	Zygomatic Width. Greatest width across the outsides of the zygomatic arches (fig. 19[5]).

Age Determination

Specimens discussed in this monograph were determined to be adult or immature on the basis of the degree of ossification of the epiphyses of the long bones of the wings (fig. 20). The degree of ossification of cranial sutures, the presence or absence of deciduous teeth, and the amount of tooth wear present were occasionally used as supporting data for age determinations. The term "prevolant" is used to describe specimens that have not yet begun to fly.

Place Names

There is no standardized method for transliterating the Iranian language (known as Farsi or Persian) into the alphabet used by English-speaking peoples. There are many ways of spelling place names that will result in nearly identical pronunciations. For example, Qazvin, a town west of Tehran, has variously been spelled Qazvin, Kazvin, Gazvin, Qazveen, and Gazveen. I have accepted the gazetteer included in Lay (1967, pp. 243-261) as the first authority on "proper" spelling of the Iranian place names used in this volume. For names not listed by Lay, spellings in the *Geographic Names Gazetteer 19, Iran* (1956) published by the U.S. Government Printing Office, Washington, D.C., are accepted. This volume was also used as the primary authority by Lay (1967) in the preparation of his gazetteer. For names not found in Lay or *Gazetteer 19,* spellings are used in the following order of preference: as they appear in the original publication; as they appear on provincial (ostan) maps published by the Geographic and Drafting Institute, Tehran; as they appear on the Iran Highway Map, 5th Ed., 1967, published by the Ministry of Roads, Tehran; as they appear on bilingual (English and Farsi) highway signs in Iran; or as they sounded to the ears of the expedition personnel when pronounced by natives.

All Iranian place names in this paper are spelled according to the above criteria with one exception. The first time a previous record is cited each place name is spelled as it appeared in the original publication. If this differs in spelling (but not if it differs only in capitalization or punctuation) from the name accepted by the above authorities, the "correct" spelling is given in parentheses, e.g., Kazvin (=Qazvin), Urmiah (=Rezaiyeh). This same notation is used for "incorrect" spellings and outdated names in direct quotes. Non-Iranian place names are spelled as they appear in the *Times Atlas, Comprehensive Edition* (1967).

Provincial Boundaries

The internal political subdivision of Iran has changed frequently since scientific analysis of the country's fauna began over 100 years ago, and no two maps seem to agree on the organization of provinces

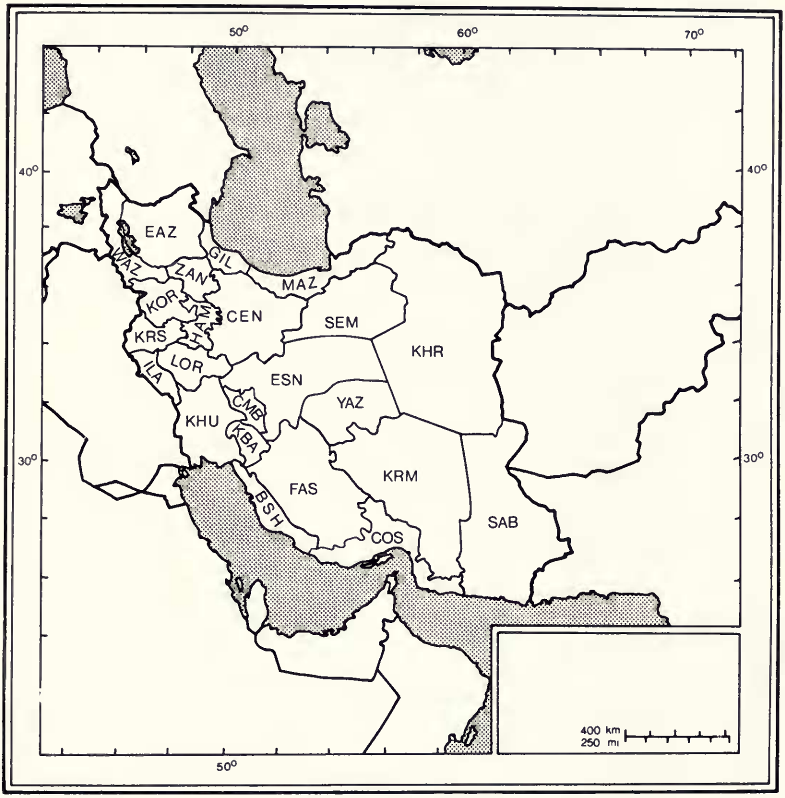

FIG. 21. Iranian provinces (ostans) based upon the *Times Atlas, Comprehensive Edition*, 1967.

within the country. While it may be argued that such flexible boundaries tend to confuse rather than clarify a volume such as this, I feel that they do provide assistance to the person who is not familiar with the names of all Iranian towns and enable one immediately to place a site in the proper region within the country. Lay (1967, pp. 14-15, 245) listed province boundaries based upon a map published by the Iranian Information Center, New York, in about 1960. At the time of our visit in 1968, the provincial organization of Iran was already very different from that used by Lay. I have adopted the provincial boundaries given in the *Times Atlas, Comprehensive Edition* (1967) because of the worldwide availability of this source. All provincial designations given in the following sections correspond to the boundaries given in this source (fig. 21).

With one exception, spelling and abbreviations of provincial names follow Nouri et al. (1973). The exception is use of the abbreviation "KRS" rather than "KRN" for Kermanshahan Province. These spellings and abbreviations are as follows:

BSH	Bushehr Province
CEN	Central Province
CMB	Chahar Mahal and Bakhtiari Province
EAZ	East Azarbaijan Province
ESN	Esfahan Province
FAS	Fars Province
GIL	Gilan Province
HAM	Hamadan Province
ILA	Ilam Province
KBA	Kahkilureh and Boyre Ahmad Chief Governate
KRM	Kerman Province
KRS	Kermanshahan Province
KHR	Khorasan Province
KHU	Khuzistan Province
KOR	Kordistan Province
LOR	Loristan Province
MAZ	Mazandaran Province
COS	Persian Gulf and Sea of Oman Coastal Province
SEM	Semnan Province
SAB	Sistan and Baluchistan Province
WAZ	West Azarbaijan Province
YAZ	Yazd Province
ZAN	Zanjan Province

Distribution Maps

Distribution maps in this volume show records of each species from Iran. Question marks indicate specimens for which the precise locality is unknown or, in a few cases, those that are of undetermined taxonomic status. Specimen records from the area surrounding Iran are provided to indicate distribution patterns. Sources for these extralimital records are usually those listed in the General Range section for each species.

Iranian Records Tables

Most species accounts include a table summarizing data on Iranian specimens. Much data for these are taken from the original publications, specimen tags, field notes, and personal communications with collectors. Thus the entry for a particular record may, and frequently does, contain more information than was included in the original publication.

The column headed "No." lists the number of individuals reported from the locality in the original publication or the number actually found in a collection, whichever is greater. The column headed "Sex" gives the number of males (♂), females (♀), and specimens of undetermined sex (?) included in the series. This information may come from the published account or from my examination of specimens or tags. The total number of individuals included under "Sex" may be smaller than that of the preceding column if the literature source did not include sex data and I examined only a portion of the series.

The "Specimens Examined" column includes the collection abbreviation and catalog numbers only of those specimens I have personally examined. In a few cases catalog numbers of specimens that are previously unreported but that I have not examined are listed in the "Remarks" column. In these instances the source of my information about the specimens is also cited.

The "Remarks and Ecological Notes" column includes the data mentioned in the above paragraph, identification of holotypes, references to previous misidentifications of the specimens, and miscellaneous comments on collecting site and methods, reproductive condition, behavior, and other data of ecological interest gleaned from the literature and specimen tags. More detailed ecological information is given, when this is available, in the "Ecological Notes" section of the species accounts.

4. KEYS TO THE FAMILIES OF BATS OF IRAN

By **External Characters:**

1 Tail less than 10 mm. in length; tragus and nasal ornamentation absent; second manual digit with small claw (fig. 17) .... PTEROPODIDAE
Chapter 5

1′ Tail more than 10 mm. in length; tragus, noseleaf, or both present; second manual digit without claw 2

2 Tail protrudes from dorsal surface of uropatagium (fig. 18D); tragus present, noseleaf absent .... EMBALLONURIDAE
Chapter 7

2′ Tail runs through entire length of uropatagium and is completely enclosed within it or extends from its posterior edge (figs. 18A-C); tragus present or absent, noseleaf present or absent 3

3 Tail extends beyond the posterior edge of the uropatagium for more than 10 mm. (usually much more) (figs. 18A, B); tragus present; noseleaf absent or only a small, simple flap (fig. 16B) 4

3′ Tail completely enclosed in uropatagium or extending only a few millimeters beyond its posterior edge (fig. 18C); tragus present or absent; noseleaf absent, or present as an elaborate structure composed of several distinct parts (e.g., fig. 16C) 5

4 Tail with at least two-thirds of its length extending beyond uropatagium (fig. 18A); uropatagium does not extend down leg to ankle; calcar absent; small simple noseleaf may be present; lower back and belly naked ..... RHINOPOMATIDAE
Chapter 6

4′ Tail with about one-half of its length extending beyond uropatagium (fig. 18B); uropatagium extends to ankle; calcar present; noseleaf absent; back and belly haired to base of uropatagium .... MOLOSSIDAE
Chapter 10

5 Tragus present (figs. 15A-C); noseleaf absent (fig. 16A) .. VESPERTILIONIDAE
Chapter 9

5′ Tragus absent (fig. 15D); complex noseleaf present (e.g., fig. 16C) .... RHINOLOPHIDAE
Chapter 8

By **Cranial Characters:**

1 Postorbital process of frontal long and well developed (e.g., fig. 22) 2

1′ Postorbital process of frontal absent or rudimentary 3

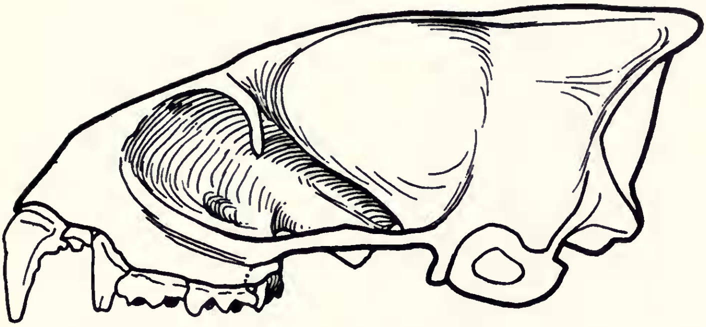

FIG. 22. Skull of *Taphozous nudiventris* (Rosevear, 1965).

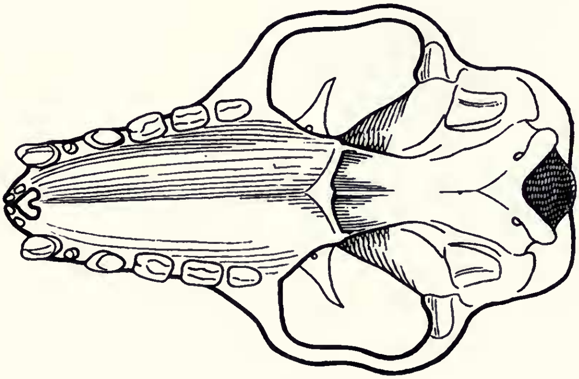

FIG. 23. Skull of *Rousettus aegyptiacus* (Rosevear, 1965).

2 Palatal branches of premaxillae present (fig. 23); dental formula 2/2 1/1 3/3 2/3 = 34 .... PTEROPODIDAE
Chapter 5

2′ Palatal branches of premaxillae absent; dental formula 1/2 1/1 2/2 3/3 = 38 .... EMBALLONURIDAE
Chapter 7

3 Nasal branches of premaxillae absent; palatal branches of premaxillae long and slender, fused to each other medially but widely separated from the maxillae laterally (fig. 24). .... RHINOLOPHIDAE
Chapter 8

3′ Nasal branches of premaxillae present; palatal branches absent, or if present, not as above 4

4 Premaxillae touching medially, small palatal branches present; nasal region of skull inflated (fig. 25) .... RHINOPOMATIDAE
Chapter 6

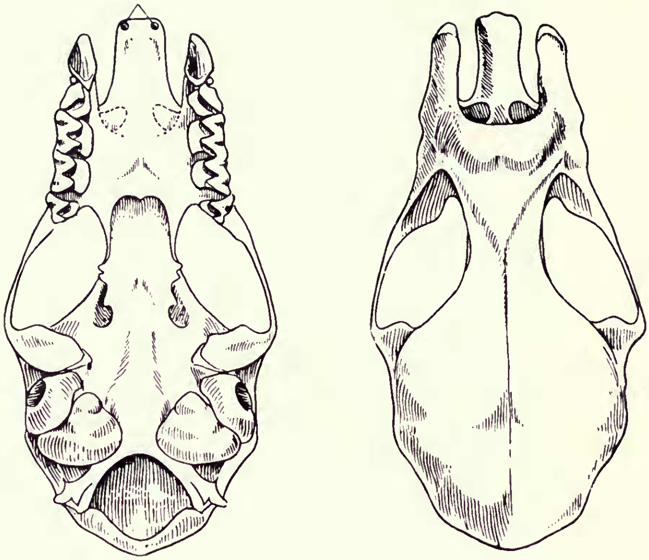

FIG. 24. Ventral and dorsal views of the skull of *Rhinolophus ferrumequinum* (Gromov, 1963).

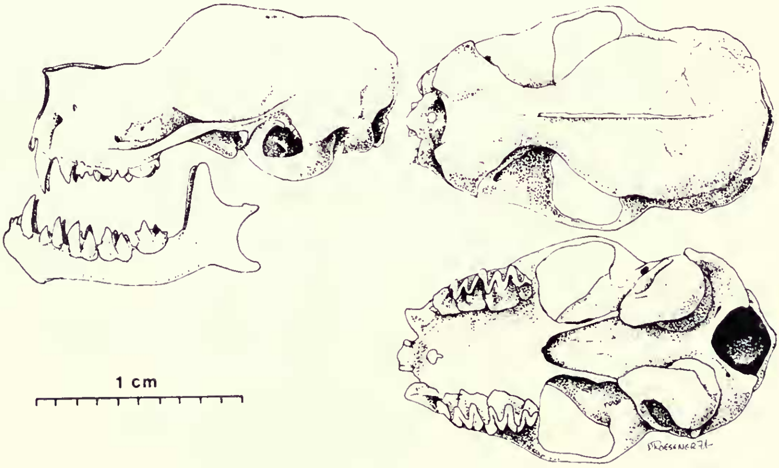

FIG. 25. Lateral, dorsal, and ventral views of the skull of *Rhinopoma hardwickei* (DeBlase et al., 1973).

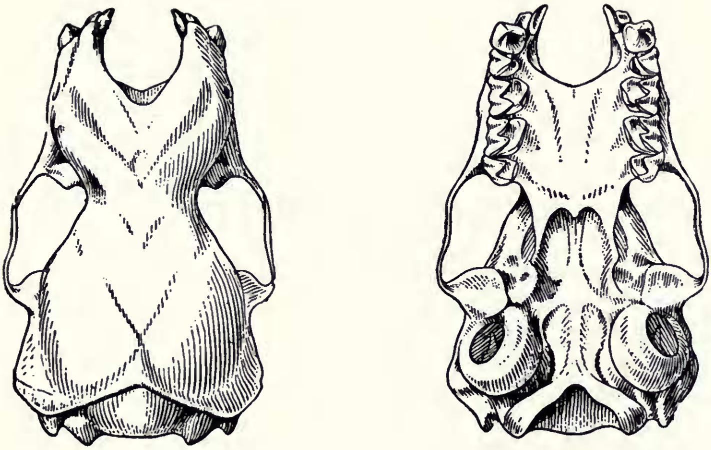

FIG. 26. Dorsal and ventral views of the skull of *Nyctalus* (Kuzyakin, 1950).

4′ Premaxillae widely separated medially and palatal branches absent, leaving palate with deep anterior emargination (e.g., fig. 26); nasal region not inflated . . . 5

5 Dental formula 1/2-3 1/1 2/2 3/3 = 30 or 32 . . . . MOLOSSIDAE Chapter 10

5′ Dental formula variable; incisors 2/3 or 1/3, if 1/3 then only four upper postcanine teeth present and total number of teeth 30 . . . . VESPERTILIONIDAE Chapter 9

5. FAMILY PTEROPODIDAE

Pteropodidae is the only family in the suborder Megachiroptera, the fruit bats or flying foxes. These bats are characterized by generally large size, a simple ear in which the inner margin of the pinna forms a complete ring (fig. 15E), large eyes, usually a vestigial tail, and a very short uropatagium (fig. 27). The second finger retains three phalanges and is clawed in most species. The skull has a long rostrum and a well-developed postorbital process (fig. 28).

Only one genus, *Rousettus* Gray, 1921, occurs in Iran, where it is represented by a single species. The dental formula is I 2/2 C 1/1 P 3/3 M 2/3 = 34.

Rousettus aegyptiacus (Geoffroy)

Pteropus egyptiacus Geoffroy, 1810, Ann. Mus. Nat. Hist., Paris, **15**, p. 96 (misprint). Corrected to *aegyptiacus* by Geoffroy in 1818, Description de l'Egypte, H. N., **2**, p. 134, pl. 3, fig. 2.

Type Locality.—Great Pyramid, Giza, Egypt.

Syntypes.—Based by Geoffroy on "Plusieurs individus." In 1912 only one of these "an adult male, mounted, in bad condition, much faded, skull *in situ;* labelled 'Egypt' (reg. no. A. 69)," was in the Paris Museum (Anderson, 1912, p. 31).

General Range:

Africa from Cape Province northwards to Senegal in the west and Egypt in the northeast (Hayman and Hill, 1971, p. 11). The Arabian Peninsula along the Mediterranean coast from southern Turkey into Israel; Aden, the Hadramaut, and Muscat (Harrison, 1964, pp. 50-51; Nader, 1975, p. 332). Cyprus (Bate, 1903, p. 341). Pakistan (Siddiqi, 1969, p. 6; Roberts, 1977, p. 34).

Iranian Distribution:

Iranian records for this species are listed in Table 1 and mapped on Figure 29. The presence of this bat in southern Arabia and Pakistan, together with the scattered records from southern Iran, indi-

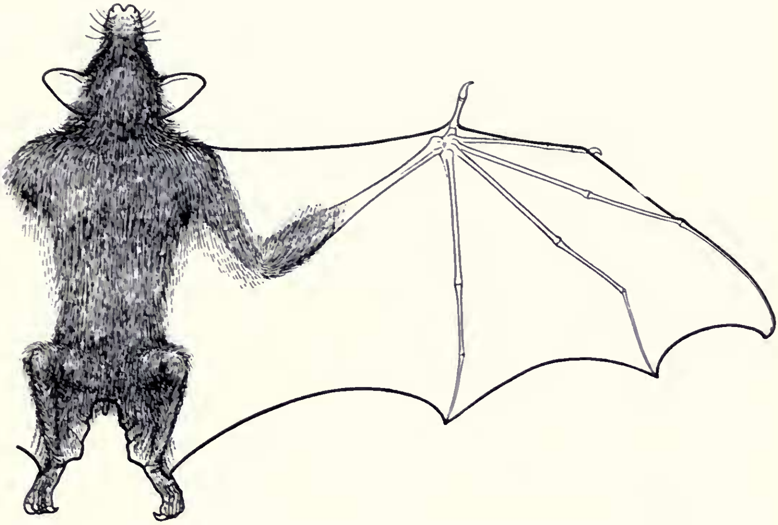

FIG. 27. *Rousettus aegyptiacus* (Rosevear, 1965).

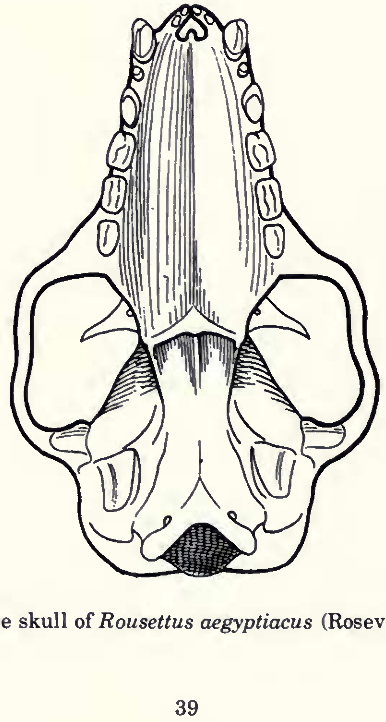

FIG. 28. The skull of *Rousettus aegyptiacus* (Rosevear, 1965).

TABLE 1. Records of *Rousettus aegyptiacus* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Blanford (1876, pp. 18-19)	Namakdun, S coast of Kishm (=Qeshm) Island	COS	—	—	—	—	"Abundant" in salt caves.
Eisentraut (1959, p. 229)	Baluchistan (no exact locality)	SAB	1	1♂	—	—	
Lay (1967, p. 131)	1.6 km. W Jahrom	FAS	9	5♂ 3♀	31 Dec. 1962	FMNH 96447-50; 96452-3; 96459-60	15 seen in cave
	Ahmad Mahmoudi	FAS	2	1♂ 1♀	1 Jan. 1963	FMNH 96456-7	Cave
Etemad (1969, pp. E3; F54)	Tiss, 9 km. from Chahabahr (=Chah Bahar)	SAB	—	—	March, 1967	—	Sight record of "some" fruit bats in fig trees in an agricultural garden. None collected.
	Baluchistan (no exact locality)	SAB	1	—	—	—	BM 19.11.7.5
New Record	5.3 km. SW Jahrom	FAS	1	1♂	12 Nov. 1968	FMNH 111008	Cave

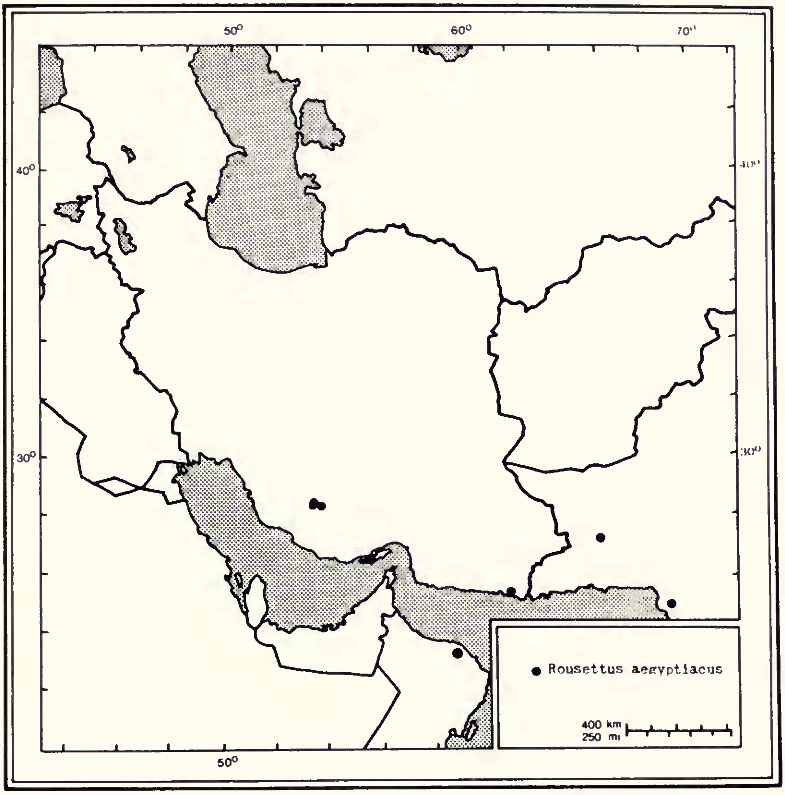

FIG. 29. Distribution of *Rousettus aegyptiacus*.

cates that it probably extends across southern Iran and occurs wherever dates and other tree-borne fruits are grown. It has not been reported from the Mesopotamian lowland of Iraq (Harrison, 1964) and thus probably does not occur on the Khuzistan Plain of southwest Iran.

Subspecies:

Rousettus aegyptiacus arabicus Anderson and de Winton

Rousettus arabicus Anderson and de Winton, 1902, Zool. Egypt, Mamm., pp. 86, 88, 89-90.

Type Locality.—Lahej, near Aden, Southern Arabia.

Holotype.—Male. BM 95.6.1.47.

Range.—Aden west through the southern Arabian Peninsula, southern Iran, and Pakistan.

A single subspecies is known from Iran.

Specimens Examined:

In addition to the Iran specimens for which catalog numbers are listed in Table 1, I have examined three *R. a. arabicus* from Panjgur, Makran, Pakistan (FMNH 82620-2). I have also examined *R. a. aegyptiacus* from Antellias, Lebanon (FMNH 99555), and from Cairo, Egypt (FMNH 78591-2, 90461-2).

Ecological Notes:

Rousettus aegyptiacus has been found only in the hot and dry southern portion of Iran and does not seem to be very numerous. Blanford (1876, p. 18) "found the species abundant" in the salt caves on Qeshm Island but neither Lay nor I found it so in the mainland areas that we visited.

Lay (1967) collected bats at approximately 10 localities in southern Iran and found *R. aegytiacus* in only two. Of these two, the Jahrom colony contained about 15 individuals and the Ahmad Mahmoudi site only two. The 1968 expedition collected bats in 13 localities in southern Iran and found only a single fruit bat. The area immediately west of Jahrom (fig. 30) is honeycombed with hundreds of small caves. We searched this area for several days for the cave Lay (1967) described, but although we visited approximately a hundred caves, we failed to locate one that fit his description. We found numerous *Rhinopoma* but only the one *R. aegyptiacus.* We also visited the cave near Ahmad Mahmoudi from which the 1962 Expedition had collected fruit bats. There again we found several *Rhinopoma* but no *Rousettus.*

Lewis and Harrison (1962) pointed out that in Lebanon the size of colonies of these bats fluctuates from season to season, with the largest numbers being present in the summer and smallest in the winter. Lay visited his southern collecting sites in November, December, and January, and we were in the southern part of the country primarily in November and December. The winter season could account for the small numbers observed. However, even if these populations increased tenfold in the summer as the Lebanese populations did, by our findings this species could still not be called common.

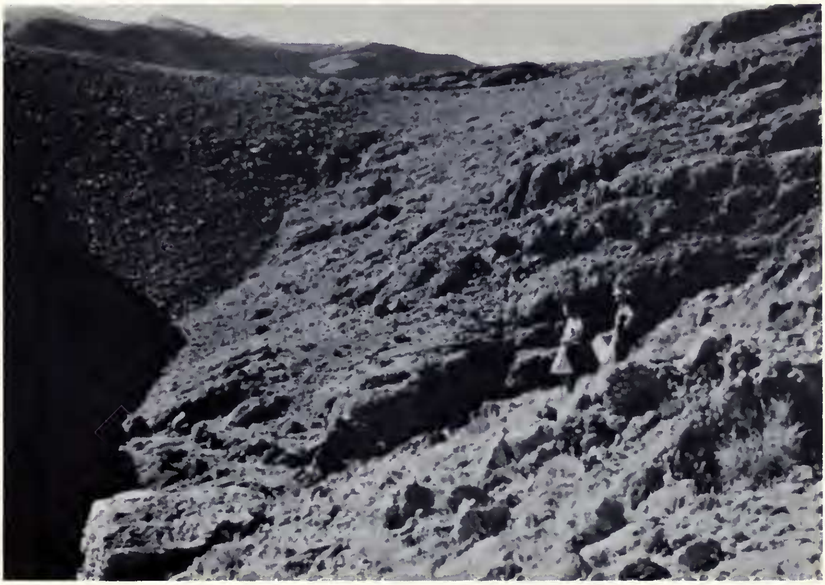

FIG. 30. One of many canyons in the flat-topped hills northwest and southwest of Jahrom.

A further indication of the rarity of the southwest Asian fruit bat in Iran is the infrequency of reference to them by local farmers. Lewis and Harrison (1962), Harrison (1964), and others referred to the damage done to dates and other fruit crops by these bats. However, the fruit growers of southern Iran did not seem to be aware of this bat's existence and when questioned by us never mentioned a bat that fed upon their crops.

The precise collecting sites of the Baluchistan specimens are not recorded. Etemad (1969, p. Farsi 51) observed what was probably this species feeding in fig trees and said that in Baluchistan these bats occur in caves and after sunset go to trees to eat fruit. All other Iranian observations of *R. aegyptiacus* have been in caves. Blanford (1876, p. 18) found them in "caves excavated in rock salt," and Lay (1967, p. 131) collected them from caves near Jahrom and Ahmad Mahmoudi.

The specimen collected by the 1968 Street Expedition hung in a high, dark dome above a large, light chamber just inside the wide cave entrance. The cave did not penetrate beyond this single large

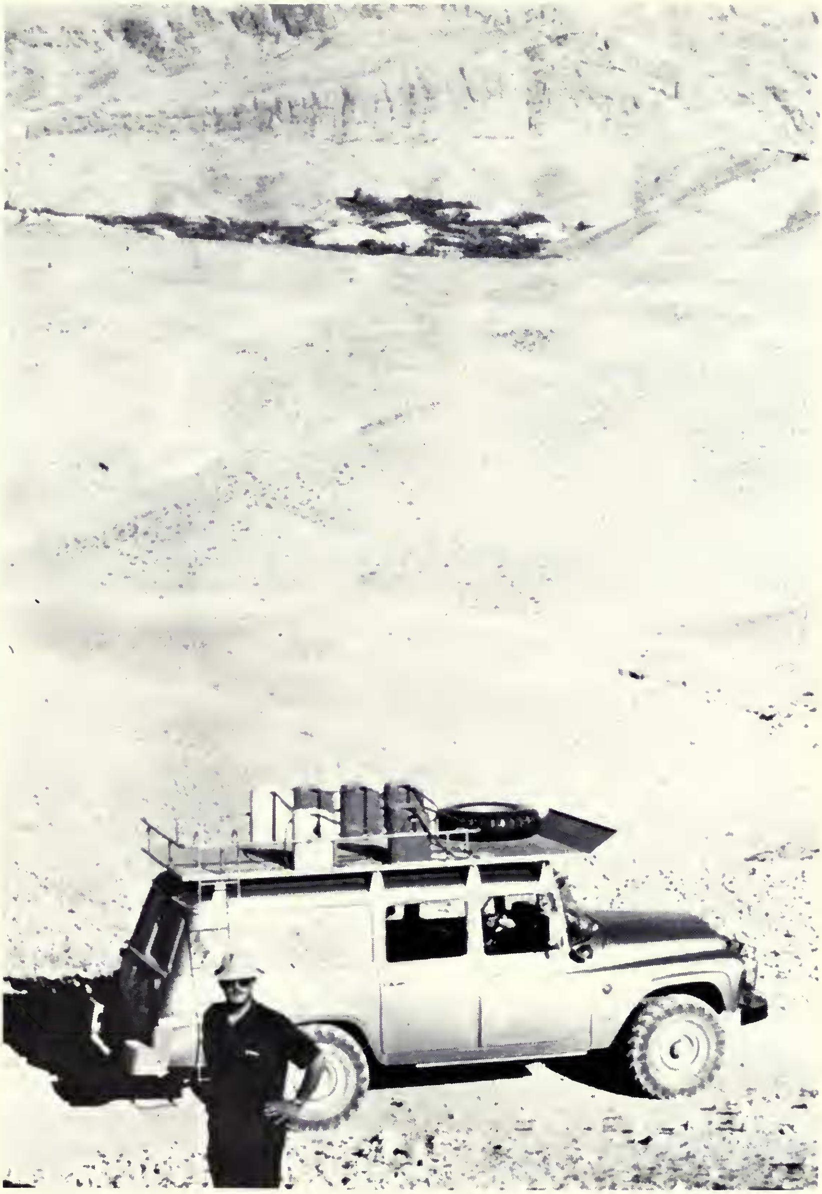

FIG. 31. The date and citrus groves at the town of Jahrom can be seen in the distance surrounded by the relatively barren countryside.

room, but the high ceiling contained several domes approximately 4 ft. in diameter. Beneath three of the unoccupied domes were accumulations of guano, but there was no guano beneath the dome occupied by the fruit bat. This cave was the largest of many located in one of the several canyons extending in a north-south direction through the group of flat-topped hills WSW Jahrom (fig. 30). The entire area was nearly devoid of vegetation, with the closest fruit and water (?) located in Jahrom (fig. 31).

The collecting site of the 1968 specimen is very similar to that found by Lay (1967, p. 82) in the same area: "totally dark and over 80° F in contrast to indirect light and cool temperature approaching 50°-60° F" in the chamber below. The specimens observed by Lay in the chamber described above flew readily upon his approach, but the 1968 specimen showed no sign of disturbance (despite excited whispers and 12 shuffling feet) until a flash photograph was taken of it.

The reproductive cycle of *R. aegyptiacus* in Iran is not known. Mutere (1968) reported that bats of this species at 0°22′ S in Uganda have two breeding seasons per year with females pregnant from December until March and from June through September. In Arabia, Nader (1975, p. 332) found that the reproductive activity extended over several months with embryos found in January, June, and July and suckling young collected in July. Gross examinations of the uteri of females collected near Jahrom, Iran, on 31 December revealed no pregnancies. No summer-month specimens are known from Iran.

6. FAMILY RHINOPOMATIDAE

The mouse-tailed bats are often considered the most primitive of the living Microchiroptera. The tail is very long and very slender. The short uropatagium encloses less than the basal third of the tail; the remainder of the tail is free (fig. 18A). A simple, inconspicuous noseleaf is usually present (fig. 32). The ears are united across the forehead and the tragus is well developed (fig. 16B). The second manual digit has two phalanges. The skull is conspicuously inflated in the nasal region and a distinct sagittal crest is usually present (figs. 33-35). The premaxillae have both a nasal and a small palatal branch but they are not fused to surrounding bone (figs. 33-35). The dental forumla is I 1/2 C 1/1 P 1/2 M 3/3 = 28.

The family contains only a single genus, *Rhinopoma* Geoffroy, 1818. Three species occur in Iran.

Key to the Species of Rhinopomatidae of Iran

1 Larger, forearm greater than 60 mm.; tail usually shorter than forearm; condylobasal length greater than 17 mm., nasal inflations of skull relatively poorly developed (fig. 33) . . . . *Rhinopoma microphyllum*

1′ Smaller, forearm usually less than 60 mm.; tail usually longer than forearm; condylobasal length less than 17 mm.; nasal inflations of skull well developed (figs. 34, 35) 2

2 Larger, forearm 52 to 60 mm.; noseleaf well developed (fig. 32A); nasal inflations of skull not projecting anteriorly over canine alveolus; posterior emargination of palate broadly U-shaped, usually penetrating to plane of last molar (fig. 34) . . . .*Rhinopoma hardwickei*

2′ Smaller, forearm 41 to 52 mm.; noseleaf absent or a simple, flat lapped ridge (e.g., fig. 32B); nasal inflations of skull projecting anteriorly over and frequently beyond the canine alveolus; posterior emargination of palate V-shaped with apex generally terminating posterior to plane of last molar (fig. 35) . *Rhinopoma muscatellum*

Rhinopoma microphyllum (Brünnich)

Vespertilio microphyllus Brünnich, 1782, Dyrenes Hist., **1**, p. 50 pl. 6, figs. 1-4.

Type Locality.—Arabia and Egypt (Brünnich, 1782), a pyramid at Giza (Anderson and de Winton, 1902).

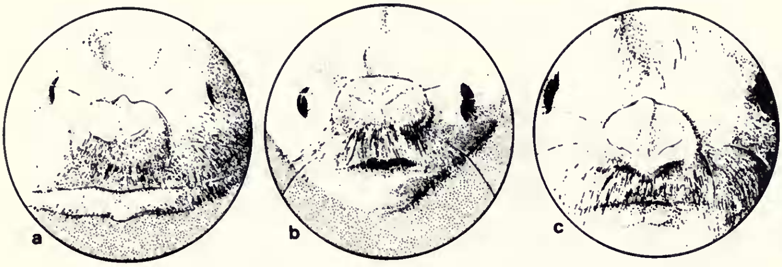

FIG. 32. Noseleafs on: **a,** *Rhinopoma hardwickei*; **b,** *R. muscatellum*; and **c,** *R. microphyllum*, drawn from specimens collected at Meshrageh. (a and b, DeBlase et al., 1973; c, Schlitter and DeBlase, 1974).

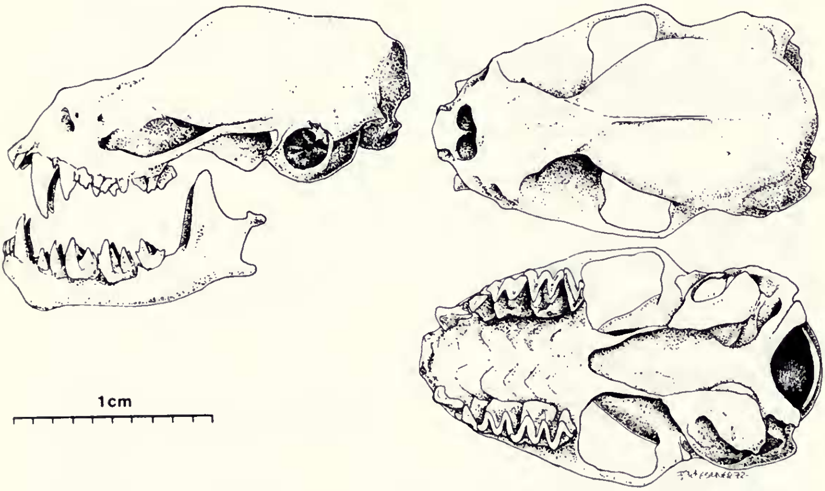

FIG. 33. Lateral, dorsal, and ventral views of the skull of the paratype of *Rhinopoma microphyllum harrisoni* Schlitter and DeBlase, collected at Meshrageh (Schlitter and DeBlase, 1974).

Holotype.—Copenhagen Museum.

General Range:

Egypt, Sudan, Algeria, SW Morocco, and Nigeria (Hayman and Hill, 1971, p. 14). Israel, Jordan, and Lebanon (Harrison, 1964, p. 54). Saudi Arabia (Nader, 1975, p. 334). Afghanistan (Gaisler 1970, p. 6), Pakistan (Siddiqi, 1969, p. 10; Roberts, 1977, p. 43), and India (Brosset, 1962, p. 31). Sumatra (Kock, 1969, p. 62).

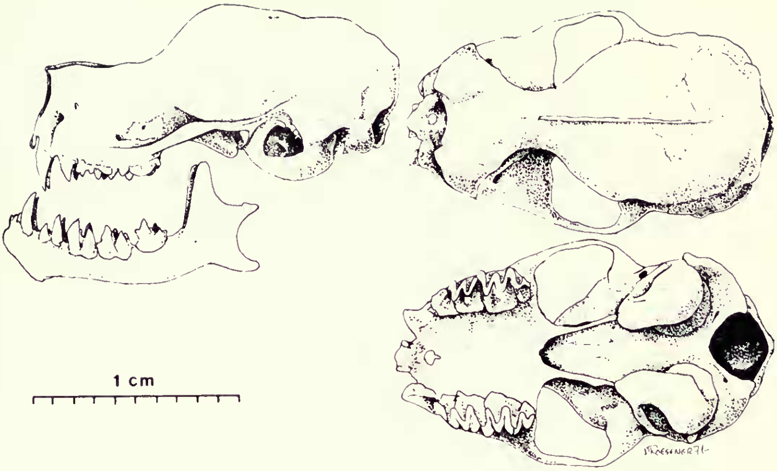

FIG. 34. Lateral, dorsal, and ventral views of the skull of *R. hardwickei* collected at Meshrageh (DeBlase et al., 1973).

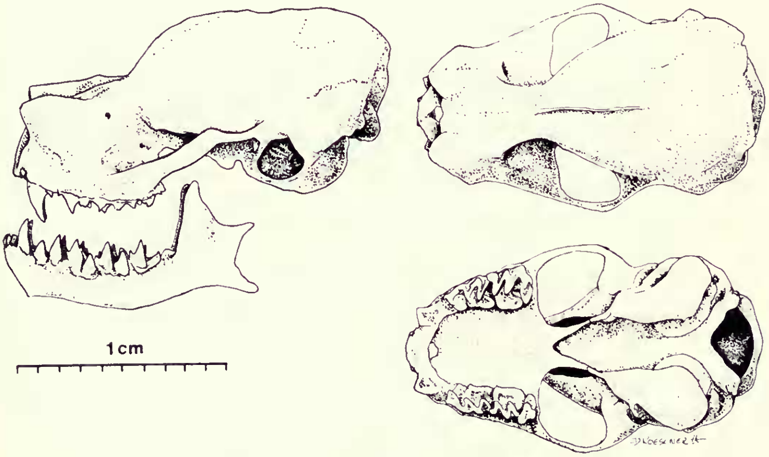

FIG. 35. Lateral, dorsal, and ventral views of the skull of *R. m. muscatellum* collected at Meshrageh (DeBlase et al., 1973).

Iranian Distribution:

Records of *R. microphyllum* from Iran are listed in Table 2 and mapped in Figure 36. These records plus those from Afghanistan and Pakistan indicate that *R. microphyllum* may be expected to occur throughout the Khuzistan Plain, along the southern coastal strip, and throughout the arid mountains south and east from Shiraz. It may also occur in eastern Iran and in the central deserts.

TABLE 2. Records of *Rhinopoma microphyllum* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
Cheesman (1921, p. 575)	Telespid	KHU	1	1♀	13 June 1902	*microphyllum*	BM 2.10.1.6	
Lay (1967, p. 134)	Ahmad Mahmoudi	FAS	1	1♂	1 Jan. 1963	*harrisoni*	FMNH 96503	cave
Etemad (1969, p. 4)	Shiraz	FAS	1	—	July 1966	*microphyllum*	—	Previously reported as *R. hardwickei* (Etemad, 1967, p. 775).
Gaisler (1970, p. 7)	Shabarparak, Misham (=Mishan)	KHU	1	1♂	"1/9/25"	*harrisoni*	BM 26.7.4.1	Shot while flying around Mishan bungalow.
Farhang-Azad (1971)	3 km. to Shushtar	KHU	13	?	9-13 Sept. 1970	*microphyllum?*	—	
Schlitter and DeBlase (1975)	Meshrageh	KHU	1	1♂	21 Oct. 1968	*harrisoni*	FMNH 111085	Paratype of *harrisoni*. Shot along river at dusk.
	10 km. SE Kazerun	FAS	14	11♂ 3♀	18 and 19 Nov. 1963	*harrisoni*	USNM 350120 350123-9; 350131-3; 350135-7	Includes holotype of *harrisoni*.
	Canae Gabru Cave *nr.* Tar Divon (=Tadovan)	FAS	32	17♂ 15♀	10 Nov. 1968	*harrisoni*	FMNH 111086-117	In entrance room of large complex cave.
	2 km. SE Mansorabad	FAS	1	1♀	24 July 1965	*harrisoni*	USNM 369541	
	10 km. WNW Bastak	COS	1	1♀	20 Nov. 1968	*harrisoni*	FMNH 111118	Entrance to small, hot cave.
	Sarin Ab-Garma Cave at Dehloran.	ILA	4	4♂	5 Sept. 1968	*microphyllum*	FMNH 111081-4	
	8 km. W Estahbanat	FAS	2	2♂	7 July 1965	*microphyllum*	USNM 369537-8	
	11 km. NW Darab	FAS	2	2♀	10 and 11 July 1965	*microphyllum*	USNM 36939-40	One lactating.
	Damen (=Damin) 30 km. N Iranshahr	SAB	7	1♂ 6♀	23 to 25 Jan. 1963	*microphyllum*	USNM 327918-20; 327926; 327943; 327945; 327949	
New Record	Dezful	KHU	1	1♂	April 1968	*microphyllum*	IPHR uncat.	"near the river."

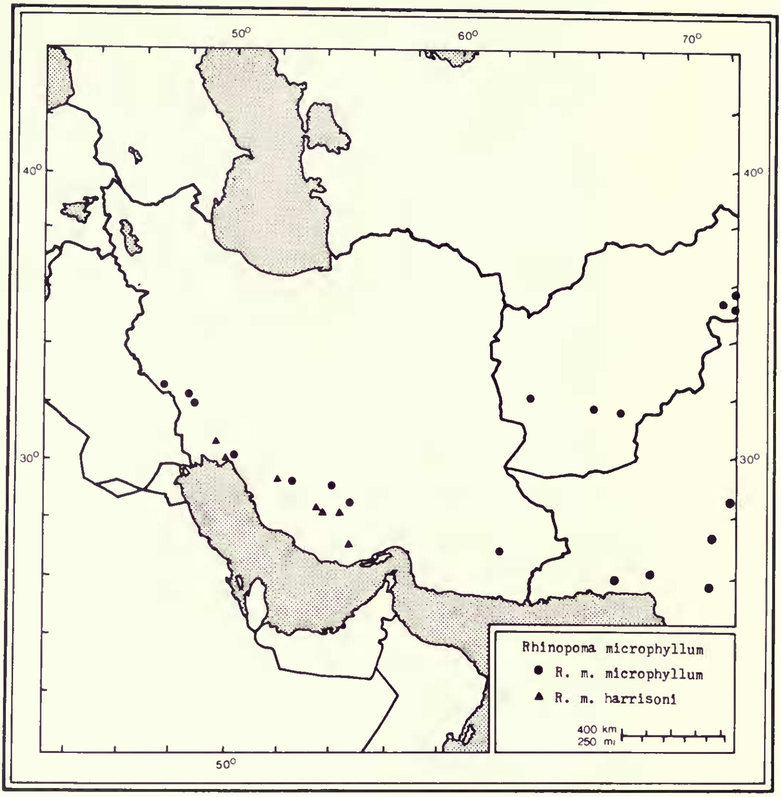

FIG. 36. Distribution of *Rhinopoma microphyllum*.

Subspecies:

Rhinopoma microphyllum microphyllum (Brünnich) (see above)

Rhinopoma microphyllum harrisoni, Schlitter and DeBlase

Rhinopoma microphyllum harrisoni Schlitter and DeBlase, 1974, Mammalia, 38, p. 658.

Type Locality.—10 km. SE Kazerun, Fars Province, Iran.

Holotype.—Adult male USNM 350124, collected on 18 November 1963.

Range.—Known only from the localities in Iran listed below.

Schlitter and DeBlase (1974) have reviewed the subspecies of *R.*

microphyllum in Iran. We determined that those from Telespid, Shiraz, Dehloran, Estahbanat, Darab, and Damin belong to the nominate form *R. m. microphyllum,* and we described a new subspecies, *R. m. harrisoni,* from Ahmad Mahmoudi, Mishan, Meshrageh, Kazerun, Tadovan, Mansorabad, and Bastak. The Dezful specimen belongs to the nominate form. I have not examined any of the series from Shushtar and thus cannot designate subspecies for these.

Rhinopoma microphyllum harrisoni is smaller than the nominate form in overall external and cranial size and has a particularly shortened forearm (♂ *R. m. harrisoni:* FA 57.5 to 66.1 mm., mean 61.7 mm.; ♂ *R. m. microphyllum:* FA 67.0 to 70.1 mm., mean 68.6 mm.; ♀*R. m. harrisoni:* FA 64.1 to 64.9 mm., mean 64.6 mm.; ♀*R. m. microphyllum:* FA 65.3 to 68.7 mm., mean 67.2 mm.). In *R. m. harrisoni* the rostral ridges converge gradually from just posterior of the nasal inflations to the point where the ridges meet just posterior to the point of least interorbital breadth (fig. 33), while in the nominate subspecies the rostral ridges are nearly parallel over half the distance between the nasal inflation and point of least interorbital breadth.

Specimens Examined:

In addition to the Iran specimens for which catalog numbers are listed on Table 2, I have examined the holotypes of *R. kinneari* from India (BM 11.12.11.1) and *R. sumatrae* from Sumatra (BM 0.8.2.17), as well as numerous specimens from Egypt, Israel, Afghanistan, Pakistan, and India.

Ecological Notes:

On 1 January 1963 Lay (1967, pp. 83, 134) collected one male *R. microphyllum* from a cave about 2 km. NW Ahmad Mahmoudi. The small cave (about 30 m. long and 15 to 20 m. wide) also contained eight *R. aegyptiacus* and 15 to 20 *R. muscatellum.* These bats flew readily when disturbed, but the *R. microphyllum* could scarcely fly and "fluttered weakly to the floor." Unlike the *R. muscatellum* it contained no body fat. I visited the same cave on 15 November 1968 and found numerous *R. muscatellum* but no *R. microphyllum.*

On 4 September 1968 I visited Sarin Ab-Garma, a large cave just north of the town of Dehloran. We arrived shortly after dusk, and the bats had begun to fly from the cave. We found several thousand

Asellia tridens, many *Miniopterus schreibersi,* and about 100 *Rhinopoma microphyllum* occupying the cave. The *Rhinopoma* hung in large, smooth-sided domes in the low ceiling of a chamber near the entrance, whereas the other two species occupied larger rooms further back in the cave. The two *R. microphyllum* collected from the air with a hand net and two more shot from their roost with dust shot from a .22 pistol were all males and all very fat. Lay (pers. comm., 1973) visited this cave in October of 1970 and estimated about 100 *R. microphyllum* were present at that time.

On 21 October 1968 we shot a male *R. microphyllum* as it flew at dusk along the Jarahi River near Meshrageh. Between 17 and 21 October, nine *R. hardwickei,* two *R. muscatellum,* 10 *Eptesicus nasutus* and one *Pipistrellus kuhli* were shot at the same location, but only the one *R. microphyllum* was taken.

On 10 November 1968 we visited a cave located high on the southeast wall of a small canyon through which the Mand River runs just north of the village of Tadovan. Hundreds of *Rhinopoma* occupied the entrance chambers of this large, complex cave. Our sample of 47 included 36 *R. microphyllum* and 11 *R. muscatellum.* (Four *R. microphyllum* were given to the Institute d'Pasteur in Tehran for rabies research.) In deeper portions of the cave *Rhinolophus hipposideros, R. euryale, R. blasii,* and *Myotis capaccinii* were collected.

On 20 November 1968 I collected one *R. microphyllum* from a small cave about 10 km. NNW of Bastak. The small, dimly lit cave contained 20 to 25 *Rhinopoma.* Our sample of 18 specimens included 17 *R. muscatellum* and the one *R. microphyllum.*

Rhinopoma hardwickei Gray

Rhinopoma hardwickei Gray, 1831, Zool. Misc., p. 37.

Type Locality.—India.

Holotype.—Spirit specimen with extracted skull, male, British Museum, no catalog number on specimen.

General Range:

Northeast Africa, through Egypt, Sudan, Eritrea, Somalia, south to Lake Rudolph in northwestern Kenya, west to Asben, Niger, Tunisia, and Morocco (Hayman and Hill, 1971, p. 14). Israel, Jordan, Iraq, Arabia, and Yemen (Harrison 1964, pp. 56-61) and Saudi Arabia (Nader 1975, p. 335). Afghanistan (Gaisler, 1970), Pakistan (Siddiqi, 1969; Roberts, 1977, p. 45), and India (Brosset, 1962).

Burma and "lower Siam" (Ellerman and Morrison-Scott, 1951, p. 102).

Iranian Distribution:

DeBlase et al. (1973) have shown that specimens from Sib (Thomas, 1920B); Seistan region (Thomas, 1913); Baluchistan, 4 km. WSW Jahrom, Ahmad Mahmoudi, and Kuh-i-Khwaja (20 km. SW Zabol) (Lay, 1967), previously reported as *R. hardwickei* are in fact *R. muscatellum.* Etemad (1967) reported *R. hardwickei* from Shiraz but later (Etemad, 1969) changed this identification to *R. microphyllum.* Wroughton (1920) reported a juvenile specimen from Ispid Lamin, Baluchistan, as *Rhinopoma* sp. This may be any one of the three species of *Rhinopoma.*

Etemad (1967) reported *R. hardwickei* from Eshgeft-Raana Cave, 5 km. N Kazerun, and (Etemad, 1969) from Tiss, 9 km. N Chah Bahar, Baluchistan. The measurements he gives for one specimen from each of these localities (Etemad, 1969, pp. 24-25) indicate that both are *R. muscatellum.*

I have not examined the two specimens from Bisheh Deraz (Lay, 1967), the two from 10 km. N Malavy, or the 96 from 3 km. to Shushtar (Farhang-Azad, 1971), all reported as *R. hardwickei.* No measurements or descriptions have been published for any of these. I thus tentatively continue to list these specimens as *R. hardwickei,* but any may, upon examination, prove to be *R. muscatellum.*

All verified records of *R. hardwickei* from Iran are listed in Table 3 and mapped in Figure 37. *Rhinopoma hardwickei* is definitely known from Iran only from four localities in the southwestern portion of the country. It probably ranges throughout the Khuzistan Plain and along the southern coastal strip to Bandar Abbas. But there is no evidence that it occurs in the more northern and eastern portions of the country where *R. microphyllum* and *R. muscatellum* are known to occur. (See comments under "Subspecies" below.)

Subspecies:

Rhinopoma hardwickei arabium Thomas

Rhinopoma cystops arabium Thomas, 1913, Ann. Mag. Nat. Hist., **12,** p. 89.

Type Locality.—Wasil, Yemen, 4,000 ft.

Holotype.—BM 13.6.19.5, an adult male skin and skull collected on "6,3,13."

Table 3. Records of *Rhinopoma hardwickei* in Iran

Source	**Locality**	**Prov.**	**No.**	**Sex**	**Date Collected**	**Specimens Examined**	**Remarks/ Ecological Notes**
Lay (1967, p. 132)	Besha Daraz (= Bisheh Deraz)	KHU	2	—	—	—	Not examined. May be *R. muscatellum*.
	Lake Famur	FAS	3	2 ♂ 1 ♀	31 Dec. 1962	FMNH 96483-5	Purchased. No ecological data known.
Farhang-Azad (1971)	10 km. N Malavy	LOR	2	—	5 to 8 Sept. 1970	—	Not examined. May be *R. muscatellum*.
	3 km. to Shushtar	KHU	90	—	9 to 13 Sept. 1970	—	Not examined. May be *R. muscatellum*.
DeBlase et al. (1973)	Meshrageh	KHU	9	6 ♂ 3 ♀	17 and 19 Oct. 1968	FMNH 111013-7; 111019-21; 111033	Shot along river at dusk.
	10 km. E Kazerun	FAS	2	2 ♂	17 and 18 Nov. 1963	USNM 350118; 350130	Cave
	10 km. E Chah Moslem	COS	1	1 ♂	25 Nov. 1968	FMNH 111071	Tall but shallow cave.

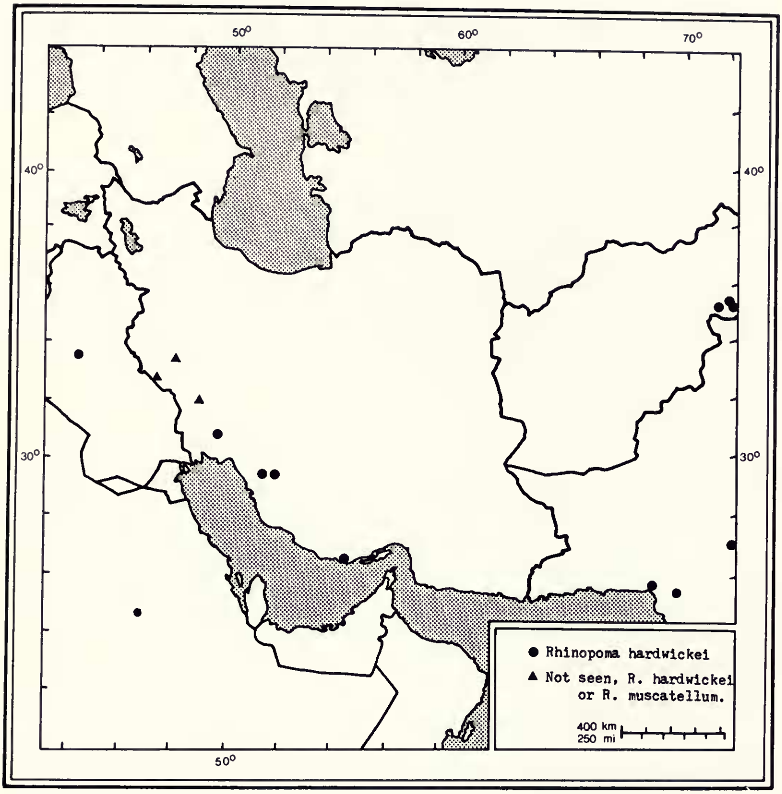

FIG. 37. Distribution of *Rhinopoma hardwickei.*

Range.—Southwestern Iran, Iraq, the Levant, Saudi Arabia, Yemen, Northern Egypt, Tunisia, Northern Algeria, Morocco, Mauritania, Niger, and Sudan (Kock, 1969, p. 42).

The specimens of *R. hardwickei* from Iran are indistinguishable in size and structure from specimens of this species which were collected from Israel and northern Egypt and which I have examined. Harrison (1964, p. 56) considered *R. h. cystops* Thomas, 1903, and *R. h. arabium* Thomas, 1913, to be synonymous and used the older name for the specimens from the Arabian Peninsula. Kock (1969, p. 42) considered *cystops,* from lower Egypt, to be distinct from *arabium.* However, he resurrected the name *Rhinopoma sennaariense* Fitzinger, 1866, then placed this name in synonymy with *R. h. arabium,* and mapped specimens from the periphery of the Sahara Desert and from the western portion of the Arabian Peninsula as *R. h. sennaariense. Rhinopoma sennaariense* is clearly a *nomen nudum* and as such is unavailable. I reject Kock's nomenclature but at least tentatively accept his classification and refer the Iran specimens to *R. h. arabium.*

The re-establishment of *R. muscatellum* and *R. m. seianum* as a species distinct from *R. hardwickei* has resulted in a wide hiatus between *R. h. hardwickei* in eastern Afghanistan and Pakistan and the easternmost record of the other currently recognized subspecies at Chah Moslem, Iran. Schlitter and I are currently reviewing the entire genus and will include in this study the question of whether or not *R. hardwickei* from Central Asia are in fact conspecific with those from southwest Asia and northern Africa.

Specimens Examined:

In addition to the Iran specimens for which catalog numbers are listed on Table 3, I have examined the holotypes of *R. hardwickei* from India (BM, uncataloged), *R. cystops arabium* from Yemen (BM 13.6.19.5), and *R. cystops macinnesi* from Kenya (BM 36.11.4.45). I have also examined numerous specimens from Egypt, Niger, Somalia, Kenya, Israel, Arabia, Pakistan, Afghanistan, and India.

Ecological Notes:

Very little is known about the ecology of this species in Iran. The Lake Famur specimens were purchased and the Meshrageh specimens were shot as they flew along the Jahari River at dusk. Bat shooting on several nights at this locality produced two *Rhinopoma muscatellum,* one *R. microphyllum,* one *Pipistrellus kuhli,* and 10 *Eptesicus nasutus* as well as the nine *R. hardwickei.* The Chah Moslem specimen was shot along with nine *R. muscatellum* from numerous bats in a tall but shallow cave. At our approach these bats flew about readily in the twilight of the cave but did not fly out into the sunlight. The two *R. hardwickei* from 10 km. E. Kazerun were from a similar cave that also yielded 14 *R. microphyllum* and four *R. muscatellum.* Meshrageh and 10 km. E Kazerun are the only localities from which all three species of *Rhinopoma* have been collected.

Rhinopoma muscatellum Thomas

Rhinopoma muscatellum Thomas, 1903, Ann. Mag. Nat. Hist., **11**, p. 498.

Type Locality.—Wadi Bani Ruha, Muscat, Oman.

Holotype.—British Museum 94.3.9.17, a male in spirit with skull extracted.

General Range:

Oman (Harrison, 1964). Southern Iran and western Afghanistan (DeBlase et al., 1973). It very likely occurs in western Pakistan as well.

Iranian Distribution:

DeBlase et al. (1973) re-established *R. muscatellum* as a distinct species and listed all known records, including several from Iran and Afghanistan that had been previously reported as *R. hardwickei*. Based upon measurements of one specimen from each locality (Etemad, 1969, pp. 24, 25), my conclusion is that the specimens reported as *R. hardwickei* from Eshgeft-Raana Cave, 5 km. N of Kazerun (Etemad, 1967, p. 275), and from Tiss, 9 km. N Chah Bahar (Etemad, 1969, p. E9), are probably *R. muscatellum*. The juvenile specimen from Ispid Lamin, Baluchistan, reported by Wroughton (1920, p. 316) as *Rhinopoma* sp. may be any one of the three recognized species.

I have not examined the two specimens from Bisheh Deraz reported by Lay (1967, p. 132) as *R. hardwickei*, nor have I examined the two from 10 km. N Malavy and the 90 from 3 km. to Shushtar reported as *R. hardwickei* by Farhang-Azad (1971). Neither measurements nor descriptions of these have been published. I, therefore, tentatively include them in the list for *R. hardwickei*, but upon re-examination they may prove to be *R. muscatellum*.

Records of *R. muscatellum* from Iran are listed on Table 4 and mapped in Figure 38. This species is known from several localities across the southern portion of Iran and probably occurs throughout the coastal lowlands and the lower, more arid mountains and basins of the southern portion of that country.

Subspecies:

Rhinopoma muscatellum muscatellum Thomas (see above)

Rhinopoma muscatellum seianum Thomas

Rhinopoma muscatellum seianum Thomas, 1913, Ann. Mag. Nat. Hist., ser 8, **12**, p. 90.

Type Locality.—Seistan.

Holotype.—British Museum specimen 6.1.2.2, a female in spirit with skull extracted.

Range.—Seistan basin of southeastern Iran and southwestern Afghanistan.

TABLE 4. Records of *Rhinopoma muscatellum* in Iran

Source	**Locality**	**Prov.**	**No.**	**Sex**	**Date Collected**	**Subspecies**	**Specimens Examined**	**Remarks/ Ecological Notes**
Thomas (1913)	"Seistan"	SAB	1	1♀	—	*seianum*	BM 6.1.2.2	Holotype of *R. m. seianum.*
Thomas (1920B)	Sib	SAB	1	1♀	—	*muscatellum*	BM 20.1.19.3	Holotype of *R. pusillum.*
Lay (1967)	Baluchistan	SAB	1	1♀	Feb. 1956	*muscatellum*	SMNS 4604	Originally reported as *R. hardwickei.*
	4 km. WSW Jahrom	FAS	14	7♂ 7♀	31 Dec. 1962 and 1 Jan. 1963	*muscatellum*	FMNH 96486-93; 96497-502	Originally reported as *R. hardwickei.*
	Ahmad Mahmoudi	FAS	3	1♂ 2♀	31 Dec. 1962	*muscatellum*	FMNH 96494-6	Originally reported as *R. hardwickei.*
	Kuh-i-Khwaja, 20 km. SW Zabol	SAB	22	6♂ 16♀	22 Nov. 1962	*seianum*	FMNH 96461-82	Originally reported as *R. hardwickei.*
Etemad (1967)	Eshgeft-Raana Cave, 5 km. N. Kazerun	FAS	1	1 ?	—	*muscatellum*	—	Originally reported as *R. hardwickei.*
Etemad (1969)	Tiss, 9 km. N Chahbahar (=Chah Bahar)	SAB	2	1♂ 1♀	1967	*muscatellum*	IPHR 2 uncat.	Originally reported as *R. hardwickei.*
DeBlase et al. (1973, p. 839)	65 km. S Ilam	ILA	14	6♂ 7♀ 1 ?	1 and 4 Sept. 1968	*muscatellum*	FMNH 111009-12; 111022-31	
	Meshrageh	KHU	2	1♂ 1♀	17 and 19 Oct. 1968	*muscatellum*	FMNH 111013-21; 111032-3	

TABLE 4. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
DeBlase et al. (1973, p. 839)	Canae Gabru Cave near Tar Divon (=Tadovan)	FAS	12	7♂ 5♀	10 Nov. 1968	*muscatellum*	FMNH 111035-44	
	6.4 km. W Jahrom	FAS	8	6♂ 2♀	8, 12 and 14 Nov. 1963	*muscatellum*	FMNH 111034; 111045-50	
	Ahmad Mahmoudi	FAS	5	3♂ 2♀	15 Nov. 1968	*muscatellum*	FMNH 111051-5	
	10 km. NNW Bastak	COS	17	9♂ 8♀	20 Nov. 1968	*muscatellum*	FMNH 111056-70; 112526-7	
	10 km. E Chah Moslem	COS	9	9♂	25 Nov. 1968	*muscatellum*	FMNH 111072-80	
	10 km. SE Kazerun	FAS	4	3♂ 1♀	18 and 19 Nov. 1963	*muscatellum*	USNM 350119; 350121-2; 350134	
	Damen (=Damin), 30 km. N Iranshahr	SAB	35	19♂ 16♀	22 to 25 Jan. 1963	*muscatellum*	USNM 327917; 327921-4; 327927-9; 327931-2; 327938-40; 327942; 327944; 327946-8; 327950-60; 327962-3; 327966-77; 327979-80	

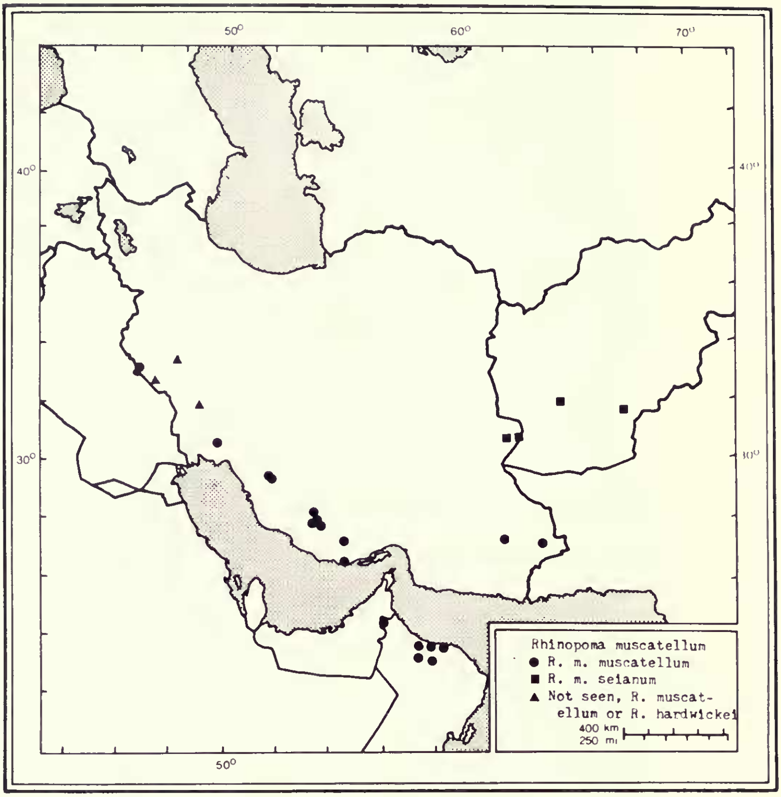

FIG. 38. Distribution of *Rhinopoma muscatellum.*

DeBlase et al. (1973) have shown that most *R. muscatellum* from southern Iran, including the holotype of *pusillum,* are referable to the nominate subspecies. The specimens from the Seistan basin average larger in external and cranial dimensions (FA 46 to 57, CBL 15.1 to 15.9) than the nominate form (FA 41.8 to 53, CBL 14.0 to 15.7) but their auditory bullae are proportionately smaller. These are referable to the form *R. m. seianum.*

Specimens Examined:

In addition to the specimens from Iran for which catalog numbers are listed in Table 4, I have examined the holotype of *R. muscatellum* from Oman (BM 94.3.9.17) and 43 specimens from two localities in Afghanistan (FMNH 102143-79, 102230, 102253-8).

Ecological Notes:

No habitat is reported for the "Seistan," Sib or "Baluchistan" specimens. Both of the localities reported by Etemad (1967, 1969) are caves but no dates are given.

Lay (1967, p. 112) found *R. m. seianum* at Zabol "in a small cave located on the southwest side of Kuh-i-Khuwaja, created by a natural slide of weathered basalt . . . [that] . . . housed approximately 200 *Rhinopoma* . . . in its bone dry chambers." He also found a lone specimen hanging in "a darkened room, one of many existing about half way up the eastern side of the mountain which archaeologists produced in excavating the ancient city of Kaha-Kaha."

Near Jahrom Lay (1967, p. 81) reported visiting an area of "flat-topped limestone mesas dissected by canyons about 4 km. W of" the city. He found numerous small caves inhabited by bats in this area and he collected 14 *R. muscatellum* and several *Rousettus aegyptiacus* on 31 December 1962 and 1 January 1963. We found two groups of such canyons, one WNW and one WSW Jahrom. Both areas contained hundreds of small caves (fig. 30), ranging from a few feet to several yards in depth, though none penetrated beyond the twilight zone. Each cave contained up to 30 or so *Rhinopoma*. These flew readily when we entered the caves but seemed reluctant to fly out into the full sunlight. When they did fly out, they darted immediately into an adjacent hole. We collected *R. muscatellum* from several of these small caves on 8, 12, and 14 November 1968 while searching for *Rousettus*.

On 31 December 1962 Lay visited a cave about 2 km. NW Ahmad Mahmoudi, where he collected one *R. microphyllum* and three of the 15 to 20 *R. muscatellum* he observed. On 15 November 1968 we visited this cave and found about a dozen *Rhinopoma*. The five collected were all *R. muscatellum.*

On 1 September members of the 1968 Street Expedition shot four *R. muscatellum* as they flew at dusk over the Meymeh River about 65 km. S Ilam. On 4 September we found a small cave in the river canyon wall approximately opposite where these bats were shot on 1 September. About 25 *Rhinopoma* were observed hanging from the walls of this hot, light cave. The 10 collected were all *R. muscatellum,* several of which were obviously immature.

On 17 October we shot a specimen of *R. muscatellum* as it flew at dusk along the Jahari River at Meshrageh. A second of this species

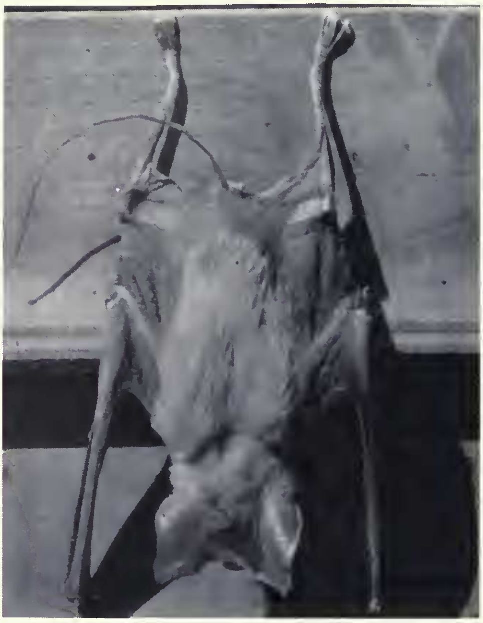

FIG. 39. *Rhinopoma muscatellum* collected near Jahrom.

was shot on the 19th. Several nights of shooting at this spot yielded several *R. hardwickei*, one *R. microphyllum*, one *Pipistrellus kuhli* and several *Eptesicus nasutus*. We could find no caves in the vicinity and were unable to determine where these bats roosted by day.

On 10 November we visited Canae Gabru, a cave high on the southeastern canyon wall along the Mand River just north of the village of Tadovan. Hundreds of *Rhinopoma* occupied the entrance chamber of this long, complex cave. They flew readily upon our arrival, and while they moved deeper into the cave they did not fly out into the full sunlight. Our sample of 47 *Rhinopoma* included 36 *R. microphyllum* and 11 *R. muscatellum*. *Rhinolophus hipposideros, R. euryale, R. blasii,* and *Myotis capaccinii* were collected in the deeper portions of this cave.

We visited a small cave 10 km. NW Bastak on 20 November and a similar cave about 10 km. E Chah Moslem on 25 November 1968. Each of these shallow hot caves contained 20 to 30 *Rhinopoma*. At Bastak one *R. microphyllum* and 17 *R. muscatellum* were collected, and at Chah Moslem we shot one *R. hardwickei* and nine *R. muscatellum*.

Rhinopoma muscatellum has been found roosting only in small, dimly lit, hot caves or in the twilight zone at the entrances to larger caves. I never observed it to hang only by its hind feet, as do most other genera, but always to cling to a wall or the sloping side of a dome with all four limbs in contact with the substrate. Individuals of this species were always active and flew readily when approached but seemed entirely reluctant to fly out of the cave into direct sun. They are fascinating to watch as they open their mouths and chatter at intruders while the long, slender tail arches up and over the back (fig. 39) and wags furiously from side to side.

In most of the samples listed on Table 4 the sexes seem to be equally well represented. Unfortunately, no summer or spring records are known (from Iran, Oman, or Afghanistan), so the habitat preferences, potential sexual segregation, and behavior of this species during the presumed breeding season is entirely unknown.

7. FAMILY EMBALLONURIDAE

The sheath-tailed bats are characterized by having the tail encased in the uropatagium proximally and lying free on the dorsal surface of this patagium distally (fig. 18D). There is no noseleaf; a tragus is present in the external ear; and the second manal digit has no phalanges. The postorbital processes of the skull are well developed (fig. 40), and the premaxillae are present only as nasal branches that are not fused to each other or to the maxillae.

One genus, *Taphozous* Geoffroy, 1818, occurs in Iran. The dental formula is I 1/2 C 1/1 P 2/2 M 3/3 = 38.

Key to the Species of Emballonuridae in Iran

1 Larger, forearm greater than 70 mm.; condylobasal length greater than 21 mm.; lower abdomen, lower back, and base of uropatagium naked (fig. 41A) *Taphozous nudiventris*

1′ Smaller, forearm less than 70 mm.; condylobasal length less than 21 mm.; hair extending into base of uropatagium from both back and abdomen (fig. 41B) *Taphozous perforatus*

Taphozous perforatus Geoffroy

Taphozous perforatus Geoffroy, 1818, Description de l'Egypte, 2, p. 162.

Type Locality.—Egypt, restricted to Kom Ombo by Kock (1969, p. 214).

Holotype.—Paris Museum No. 372 (Anderson and de Winton, 1902, p. 138).

General Range:

West Africa from Senegal and Mauritania to Nigeria; East Africa from Rhodesia north to the Nile delta (Kock 1969, p. 81). Western Arabia (Harrison, 1964, p. 70; Nader, 1975, p. 336). Oman (Harrison, 1968, p. 323). Pakistan (Siddiqi, 1969, p. 7; Roberts, 1977, p. 46). Kutch, Kathiawar, and northern Gujarat in western India (Brosset, 1962, pp.34-35; Sinha, 1970, p. 84).

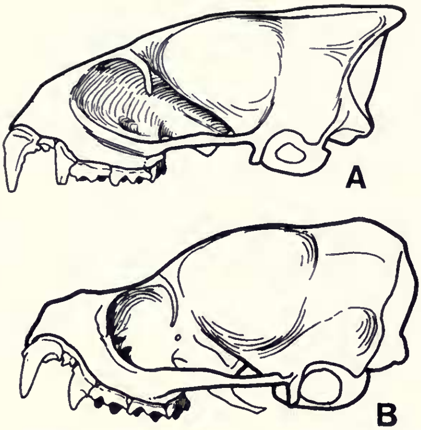

FIG. 40. Skulls of: **A,** *Taphozous nudiventris*; and **B,** *T. perforatus* (Rosevear, 1965).

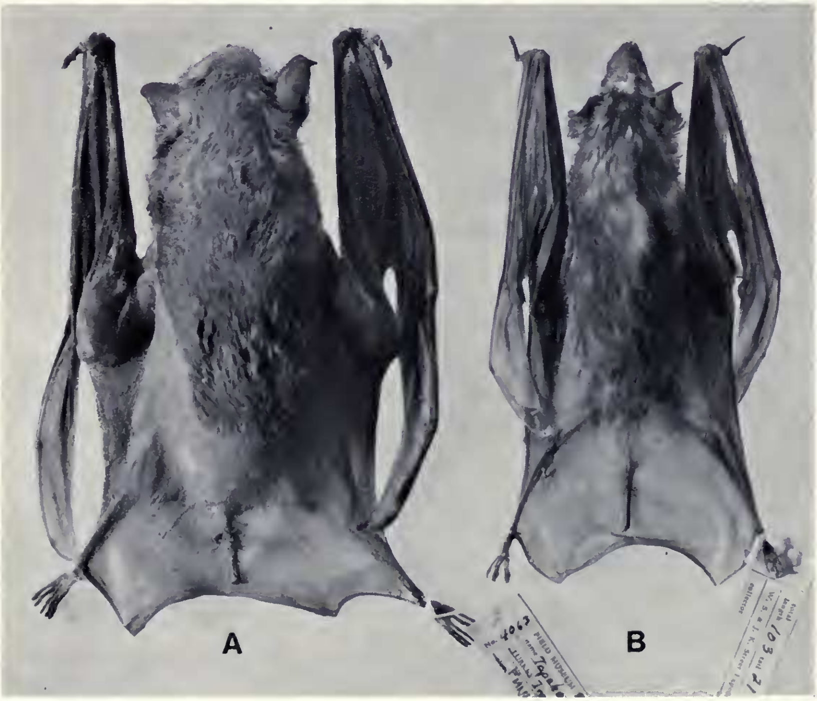

FIG. 41. Study skins of: **A,** *Taphozous nudiventris*; and **B,** *T. perforatus* from Iran.

Iranian Distribution:

DeBlase (1971a, p. 10) reported a male *Taphozous perforatus* collected by the 1968 Street Expedition on 22 November 1968 from Chah Moslem, about 57 km. north of Bandar-e-Lengeh (FMNH 111128) and a second male on 29 November 1968 from Minab. Both localities are in Persian Gulf and Sea of Oman Coastal Province (fig. 42).

The two localities above, both on the narrow, southern coastal strip, are the only Iranian records. However, in view of the world range of this species, it is not unlikely that it ranges east along the Mekran Coast of Iran and Pakistan and extends along the Iranian coast west from the Chah Moslem area.

Subspecies:

Taphozous perforatus perforatus Geoffroy (see above)

Only the nominate form is known from Iran. This subspecies also occurs in Egypt, Oman, Pakistan, and India. Harrison (1968, p. 323) described the specimens from Oman as distinctly paler in color than *T. p. haedinus* from southwest Arabia and hardly distinguishable in color from material from Sudan and Kutch. The Iranian specimens are also considerably paler than the *T. p. haedinus* specimens in the collection of Field Museum.

The specimens from Iran are slightly larger than specimens from India, Pakistan, and Oman and in most measurements (table 5) fall within the range of specimens from Egypt. The two Iranian specimens differ significantly from others only in the size of the ear. Since the two were collected and prepared almost a week apart and since our ear measurements for other species do not differ significantly from those published by other authors, I must assume that the measurements on Table 5 are correct.

Specimens Examined:

In addition to the two Iran specimens listed above, I have examined 28 *T. p. perforatus* from Giza, Egypt (FMNH 77167-94), and three from the Jati Tatta District, Pakistan (BM 60.254-6). I have also examined the holotype of *T. p. haedinus* from Northern Guaso Nyiro, Chandler Falls, Kenya (BM 12.7.1.46).

Ecological Notes:

In India Brosset (1962, p. 35) found *T. perforatus* only in man-

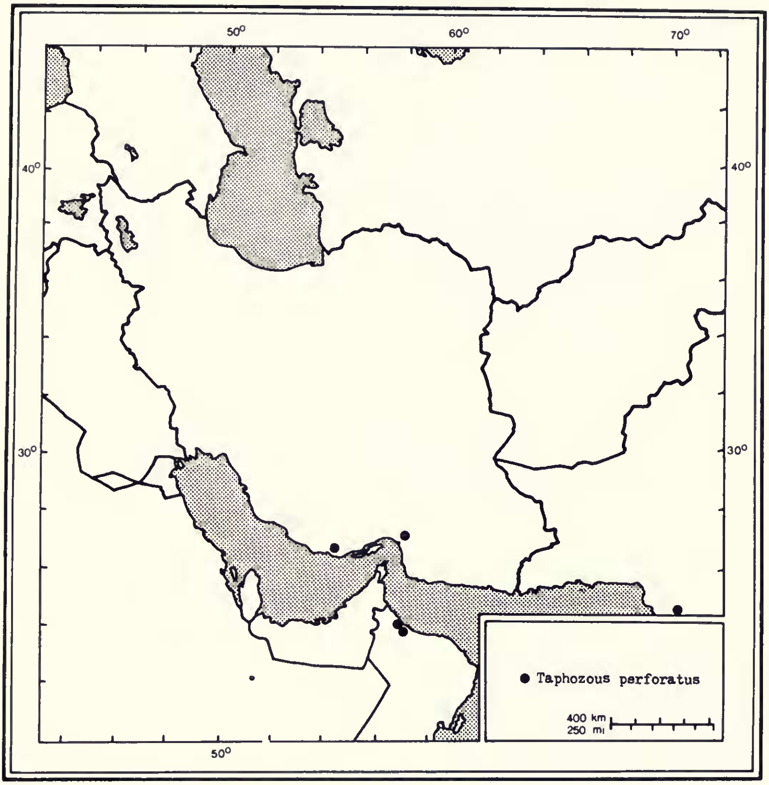

FIG. 42. Distribution of *Taphozous perforatus*.

made constructions in good condition. They were not found in ruins or in naturally occurring caves and crevices. Harrison (1964, p.73; 1968, pp. 323-24), however, reported Arabian specimens from natural crevices, caverns, tunnels, sea caves, and abandoned farmhouses. Gaisler et al. (1972, p. 12) found them in a crypt in Egypt.

The first Iranian specimen was shot on 22 November 1968 as it flew high over the flat agricultural lands near Chah Moslem, and the second was shot on 29 November as it flew over the Minab River at the edge of the town of Minab. While the roosting site of these specimens was not located, all of the possibilities mentioned by Harrison, with the probable exception of sea caves, were readily available to them. On both occasions when these specimens were collected, loud clicking sounds were audible from high-flying bats.

TABLE 5. Measurements of *Taphozous perforatus*

Measure	Iran	Egypt[1] Males	Egypt[1] Females	Oman[2]	Pakistan[3]	India[4]
TL	103 (2)	101 (6)	102.3 (9)	93.5 (9)	98.0 (3)	
	103-103	99-102	101-106	87-97.8	93-101	
T	23 (2)	22.6 (6)	23.4 (9)	22.9 (9)	23.3 (3)	25.9 (8)
	21-25	22-23	22-26	18.2-28	22-25	21-30
HF	13 (2)	14 (6)	13.6 (9)	11.2 (9)	11.3 (3)	
	13-13	14-14	13-15	10.2-12.1	11-12	
E	20 (2)	17.3 (6)	17.5 (9)	17.2 (9)	17.6 (3)	
	19-21	17-18	17-18	16.2-18.2	17-18	
FA	63.4 (2)	64 (6)	64 (9)	60.7 (9)	62.6 (3)	60.8 (8)
	62-64.5	63-65	63-66	58.9-61.8	61.5-64.0	59-63
GLS	20.7	20.3 (6)	20.1 (9)	20.2 (8)		20 (2)
		20.1-20.6	19.8-20.3	19.7-20.5		20-20
CBL	19.3			18.9 (8)		
				18.2-19.2		
ZW	11.9	11.7 (6)	11.6 (9)	11.5 (7)		11 (2)
		11.6-11.8	11.4-11.7	11.2-11.8		11-11
BB	10.4	9.5 (6)	9.3 (9)	9.0 (8)		
		9.3-9.7	9.0-9.5	8.9-9.3		
C-M^3	8.4	8.5 (6)	8.5 (9)	8.4 (9)		8 (2)
		8.5-8.5	8.4-8.6	8.2-8.6		8-8
C-M_3	9.6			9.2 (9)		10 (2)
				9.1-9.4		10-10
ML	15.5			15.0 (9)		15.5 (2)
				14.7-15.4		15-16

---

[1] Setzer (1952, p. 349) [2] Harrison (1968, p. 342) HF(su) [3] BM specimens, Nos. 60.254-6 [4] Brosset (1962, pp. 33-34)

However, on both occasions specimens of *Tadarida* were also collected from approximately the same heights and it was impossible to determine which species, if not both, was making the sound.

Both Iranian specimens are males and there is no external evidence of testes in the specimen from Minab. The reproductive cycle in Iran is not known. In India a single young is born in May (Brosset, 1962, p. 36). None collected in March and April in Oman were pregnant (Harrison, 1968, p. 324), but one from near Lahej, Aden, contained a single fetus in late March (Harrison, 1964, p. 73). Sixteen females collected in Egypt on 30 April all "showed advanced pregnancy, each containing one embryo 13.5 to 21.5 mm. in length" (Gaisler et al., 1972, p. 13).

Taphozous nudiventris Cretzschmar

Taphozous nudiventris Cretzschmar, 1830 *vel* 1831. *In:* Senck enbergische Naturf. Ges., Atlas Reise nördl. Afrika. Rüppell, Säugeth., **70**, fig. 27b.

Type Locality.—Giza, Egypt.

Lectotype.—Senckenberg-Museum Frankfort no. 4310. Male "Gizeh Pyramiden" (Kock, 1969, p. 83).

General Range:

From Mauritania and Portuguese Guinea in West Africa to East Africa from Tanzania north to Egypt (Kock, 1969, p. 87). Aden, the Hadramaut, and Oman; Israel, Jordan, and Iraq (Harrison, 1964, pp. 66, 69). Afghanistan (Gaisler, 1970, p. 14). Pakistan (Siddiqi, 1969, p. 7; Roberts, 1977, p. 48). Western and central India, Sikkim, and Burma (Brosset, 1962, p. 53). Chasen (1940) reported it from the "Malay States," but Medway (1969, p.18) refuted this report.

Iranian Distribution:

Iran records of *T. nudiventris* are listed in Table 6 and mapped in Figure 43.

This species has now been reported from four localities on the Khuzistan Plain and most likely occurs throughout this Iranian section of the Tigris-Euphrates lowland. Basket Mountain and Varamin are both east of the Zagros Mountain divide. These locations indicate that *T. nudiventris* extends across the Zagros from Iraq and may well be found throughout Iran west of the central deserts. The regions east and south of the central deserts have been incompletely sampled, and the specimens reported from Afghanistan (Gaisler,

TABLE 6. Records of *Taphozous nudiventris* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Cabrera (1901, p. 275)	Mohanmerah (= Khorramshahr)	KHU	2	1♂	October	—	
Etemad (1967, p. 275)	Varamin, 37 km. SE Tehran	CEN	—	3♂ 3♀	26 June 1966 and Autumn, 1966	HZM 16.4413 UIM 38953 IPHR 1 uncat.	In June, group under ceiling of Castle of Aladdin. In autumn, one on wall inside same castle.
Lay (1967, p. 134)	Basket Mountain	WAZ	50	48♂ 2♀	19 and 21 Sept. 1962	FMNH 96504-39	From large vertical cracks in rock.
New Records	Basket Mountain	WAZ	—	7♂	5 Aug. 1968	FMNH 111119-25	From large vertical cracks in rock.
	Bandar-e-Shahpur	KHU	2	1♂ 1♀	22 Oct. 1968	FMNH 111126-7	Mistnetted as they flew from under eaves of building.
	26 km. E Haft Tappeh	KHU	1	1♂	17 May 1969	MMTT 242	Immature; shot near village.
	Darkhwein (= Darkhovin)	KHU	3	3♂	13 to 18 Sept. 1970	IPHR 3477-8; 3620	

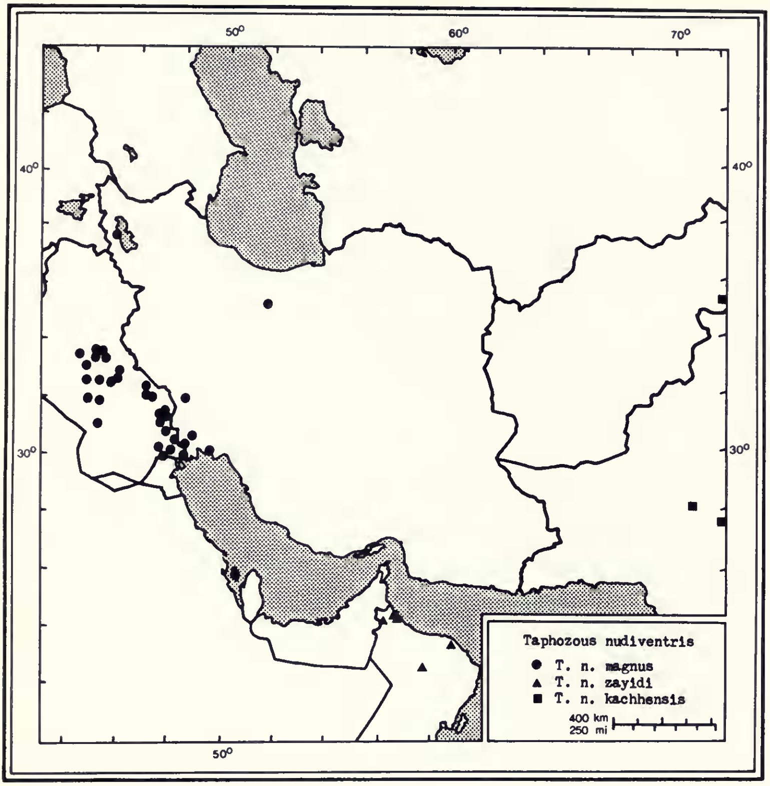

FIG. 43. Distribution of *Taphozous nudiventris.*

1970, p. 14) and from Pakistan (Siddiqi, 1969, p. 7) indicate that it may be found throughout this eastern portion of Iran as well.

Subspecies:

Taphozous nudiventris magnus Wettstein

Taphozous magnus Wettstein, 1913, Ann. Naturh. (Mus.) Hofmus, Wein, **27**, p. 466, pl. XX, figs. 1-6.

Type Locality.—Basra, Euphrates, Iraq.

Range.—The Tigris-Euphrates valley of Iraq, the Khuzistan Plain of southwestern Iran, and the mountainous areas of north and south central Iran. The subspecies of the specimens from south central Afghanistan has not been reported. Gaisler (1970, p. 15) considered the possibility that these might be *T. n. magnus* but data are not available.

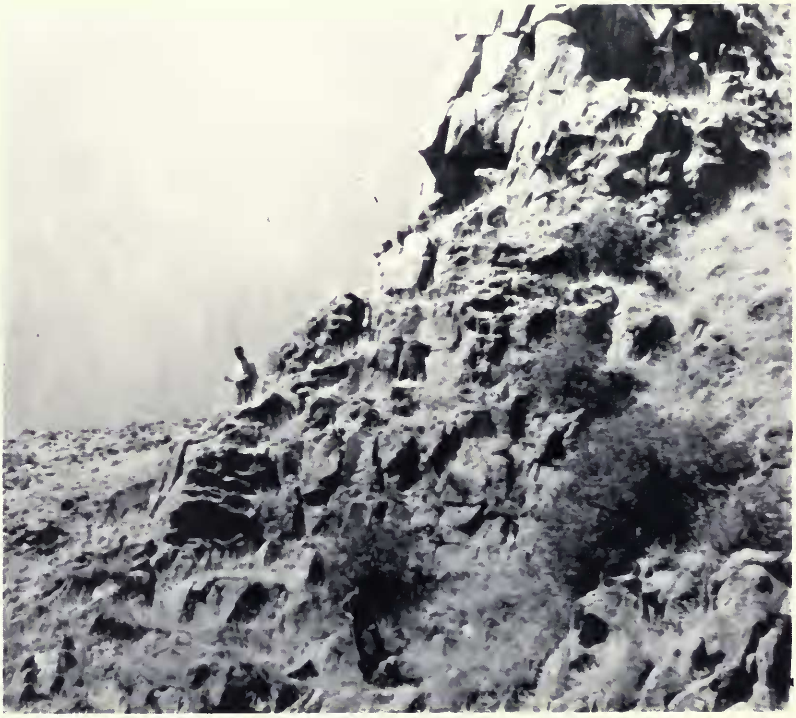

FIG. 44. Basket Mountain on the shore of Lake Rezaiyeh north of the town of Rezaiyeh. Cracks containing *Taphozous nudiventris* were found here on 19 and 21 September 1962 and 5 August 1968.

Iranian specimens agree in size and color with *T. n. magnus* from Iraq. They are considerably larger than *T. n. zayidi* from Oman (Harrison, 1964, p. 67) and do not have the ash grey color of this subspecies. *Taphozous n. magnus* is also larger than *T. n. nudiventris* from Egypt and is heavier and more robust; however, Harrison (1964, p. 69) indicated that *T. n. nudiventris* from Palestine is intermediate between the two forms.

Specimens Examined:

In addition to the Iran specimens of *T. n. magnus* for which catalog numbers are listed in Table 6, I have examined the holotype of *T. kachhensis babylonicus* Thomas from Euphrates River, Iraq (BM 50.10.12.3). I have also examined the holotype of *T. n. zayidi* Harrison from El Ain, Buraimi Oasis, Oman (BM 67.12.2.5), and the co-type of *T. kachhensis* Dobson from Cutch, India (BM 9.1.4.42).

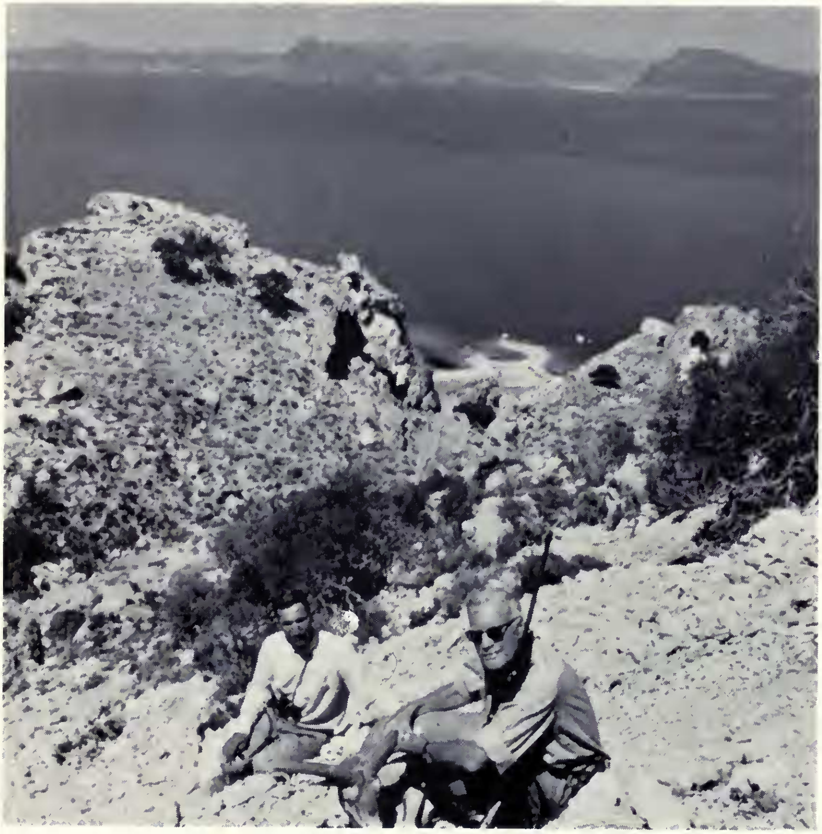

FIG. 45. Lake Rezaiyeh as seen from Basket Mountain.

Ecological Notes:

On 19 and 21 September 1962 Lay collected over 50 *T. nudiventris* from narrow cracks in the exposed rock high on Basket Mountain (fig. 44) and observed more specimens in other cracks. Of the large sample collected only two were females (Lay, 1967, p. 135). On 5 August 1968 W. S. Street and I collected seven males from long vertical cracks in the exposed granite of the same mountain. Inhabited cracks were easily identified by odor and by the piles of guano spilling from the base.

This species is migratory in Iraq (Harrison, 1964; Al-Robaae, 1968), and since Basket Mountain represents the northernmost point in its range (Lay, 1967, p. 134) and has a mean January temperature of 0° C (Gangi, 1968, p. 221), it may be assumed that this location is not inhabited year round. Lay (1967, p. 135) believes that the large guano piles beneath the fissures suggest their use as roosts during the hot summers. I concur in this and further suggest that the high ratio of males to females (only two females in the 57+ specimens examined) indicate that this site is a "bachelor" grouping rather than a breeding or maternity colony.

Such all-male colonies have been reported by Al-Robaae (1968, p. 25) from Iraq. There the sexes separate in late April and reunite in late August, remaining in sexually mixed colonies through the remainder of the year. The August collecting date at Basket Mountain falls well within this period of sexual segregation. The September dates are two to three weeks later than the date of remixing in Iraq, but the presence of two adult females in this series probably indicates that the sexes have begun their post-partum reunification. The later date of re-association could reflect a later parturition due to the later spring in this northerly location.

The tight cracks from which the bats were collected fit Al-Robaae's (1968, p. 26) description of roosting sites for all-male colonies. In Iraq the nursery colonies are about 100 to 300 meters from the male colonies (Al-Robaae, 1968, p. 26). Unfortunately, an extensive search of Basket Mountain was not undertaken. A maternity colony may have been present nearby.

The specimens from Varamin (Etemad, 1967, p. 275; 1969, pp. F71-72) were taken from under the ceiling of an old tomb, the "Castle of Aladdin," on 26 June 1969. Etemad did not give the size or sex ratio of this population in either publication; however, he listed measurements of one male and one female in the 1967 paper and repeated these measurements along with those of another male in the 1969 publication. In addition, I have examined one male from this series in the University of Illinois Museum, a female in the Harrison Zoological Museum, and a female in the Iran Public Health Research Collection. The forearms of all three males measured 74.4 mm., and the forearms of the three females measured 78.8, 81.8, and 75.3 mm. respectively. All three males and one of the females have forearm measurements well below the smallest of the adults from Basket Mountain and below those of the immatures from Bandar-e-Shahpur and Haft Tappeh (Appendix I). It is therefore assumed that the Varamin site is a nursery colony with adult females and young of both sexes.

On 22 October 1968, while visiting Bandar-e-Shahpur, we were told that a large building harbored many bats and were shown holes just under the straw and mud roof from which it was said the bats exited. We placed a mistnet in front of these holes before dusk and waited. At 6:30 P.M. a male *T. nudiventris* flew out of a hole and became entangled in the net. At 7:05 P.M. a female of the same species was taken as it exited from a neighboring hole. No other bats were seen and at 8:30 P.M. the net was removed. Both of the bats collected were young of the year, with poorly ossified phalangeal epiphyses. The forearms measured 77 and 78 mm., which is consistent with the forearm lengths of young of the year in October in Iraq (Al-Robaae, 1968, p. 24).

In Iraq *T. nudiventris* copulates in September and October. Hibernation begins in late November and continues to late March. Delayed fertilization occurs at this time and by late April the sexes have segregated into separate colonies. The young are born in late May and after six months have reached almost adult size (Al-Robaae, 1968).

As was mentioned above, the Basket Mountain site is a male summer colony and it is probable that the Varamin site is a nursery. The Bandar-e-Shahpur site may be a nursery or a hibernaculum; we did not gain access to the building and were unable to check for roosting bats.

Neither of the two females collected at Basket Mountain was pregnant, though both had enlarged nipples. Neither Cabrera (1901, p. 118) nor Etemad (1967) mentioned the reproductive status of the females they collected.

Taphozous nudiventris occupies a variety of roosting sites. Harrison (1964, p. 69) and Brosset (1962, p. 54) regarded it as primarily a crevice dwelling form that is found regularly in artificial caves and cracks in old masonry. Harrison (1964, p. 70) also mentioned its occurrence in crevices beneath the roofs of old buildings. Al-Robaae (1968) reported that in Iraq this species inhabits different roosts at different times of the year with old stone buildings, caves, and crevices utilized during the summer, and "old wooden ceilings and ceilings lined with bamboo and rags made of palm tree leaves" preferred during the winter. Tomb bats have been taken from each of these habitat types in Iran.

Brosset (1962, p. 53) pointed out that the distribution of this bat in India is limited by humidity. He found it only in areas of less than

50 in. annual rainfall. This climatic factor would, in Iran, exclude it only from the north slope of the Elburz Mountains and from the Caspian coast. Rocky outcrops and old tombs and temples are abundant over all of Iran. Thus *T. nudiventris* potentially ranges over the entire country south of the Elburz Mountains.

8. FAMILY RHINOLOPHIDAE

Horseshoe bats, family Rhinolophidae, are characterized by the presence of a complex fleshy nasal ornamentation that is composed of several distinct parts. The tragus is absent and the antitragus is usually well developed (fig. 15D). The premaxillae are represented only by palatal branches that are sutured to each other medially and are separated from the maxillae laterally by deep emarginations of the palate (fig. 24). Two subfamilies are known and frequently recognized as distinct families. Both occur in Iran.

The members of the subfamily Rhinolophinae are characterized by a complex noseleaf (fig. 46). At the tip of the muzzle is a flat horseshoe, extending from the upper lip and encircling the nostrils. In the middle of the horseshoe a transverse lancet stands erect and terminates in a single apex. A longitudinally oriented sella connects

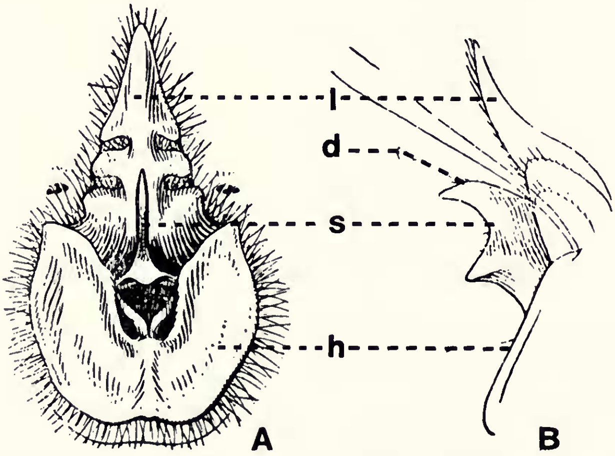

FIG. 46. Anterior (A) and lateral (B) views of a *Rhinolophus* noseleaf: h, horseshoe; s, sella; d, dorsal collecting process of the sella; l, lancet (Kuzyakin, 1950).

the horseshoe and lancet. Much of the taxonomy of this group is based upon variations in the structure of the complex noseleaf. The taper of the lancet may be uniformly triangular or constricted to produce a fine linear tip. The base of the sella (in anterior view) may be parallel-sided or triangular. The anterior projection of the sella may be broadly rounded or more or less tapered and pointed. The dorsal connecting process of the sella varies from a bluntly rounded or squared-off projection to a long, sharply pointed, antero-dorsally projecting process. The dental formula is usually I 1/2, C 1/1, P 2/3, M 3/3 = 32.

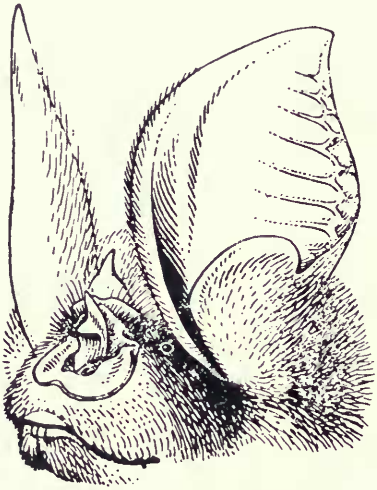

Fig. 47. The head of *Rhinolophus mehelyi* illustrating the noseleaf and ear characteristic of this genus (Kuzyakin, 1950).

The genus *Rhinolophus* Lacēpède, 1799, is known from Iran, where six species have been reported. A seventh species is known from adjacent portions of Afghanistan and may also occur in Iran.

The Hipposiderinae differ from the Rhinolophinae in numerous details of the postcranial skeleton, particularly the pelvic girdle. They also differ in the structure of the nasal ornamentation. In Hipposiderinae the sella and connecting process are lacking; an erect transverse lobe corresponding to the lancet is, in Iranian species, divided into three distinct, dorsally projecting lobes; and

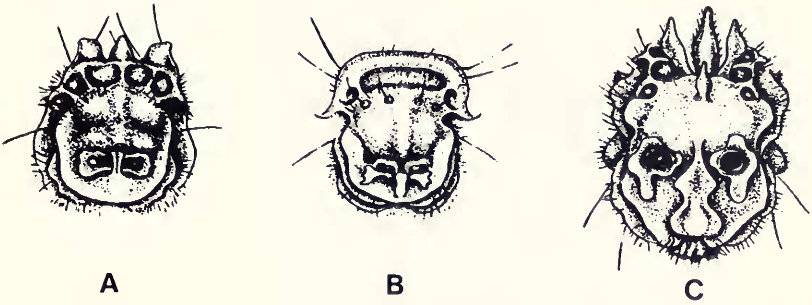

FIG. 48. Noseleafs of bats of the subfamily Hipposiderinae. **A,** *Asellia tridens*; **B,** *Hipposideros caffer*; and **C,** *Triaenops persicus* (Harrison, 1964).

between this erect portion and the nostrils, the noseleaf is divided into a complex series of cells (fig. 48).

Two genera, *Asellia* Gray, 1838, and *Triaenops* Dobson, 1871, are known to occur in Iran, where each is represented by a single species. One species of the genus *Hipposideros* Gray, 1831, is known from the adjacent portion of Pakistan and may also occur in Iran.

KEY TO THE SPECIES OF RHINOLOPHIDAE IN IRAN

1 Noseleaf with a distinct sella and connecting process; the lancet a single, elongated, dorsally projecting structure (fig. 47) (Rhinolophinae) 2

1′ Noseleaf without sella or connecting process; "lancet" a single flat-topped flap or composed of three dorsally projecting structures (fig. 48). (Hipposiderinae) 8

2 Size large; forearm 52 to 61 mm.; condylobasal length 19 to 21 mm. (fig. 49A); condylocanine length 18 to 20 mm.; first upper premolar displaced labially from toothrow (fig. 50A); dorsal connecting process of sella blunt (fig. 51E) *Rhinolophus ferrumequinum*

2′ Size smaller; forearm 35 to 53 mm.; condylobasal length less than 19 mm.; condylocanine length less than 18 mm.; position of first upper premolar and shape of dorsal connecting process of sella variable 3

3 Size small; forearm 35 to 44 mm.; condylobasal length less than 16 mm. (fig. 52C); condylocanine length less than 15 mm. 4

3′ Size larger; forearm 43 to 53 mm.; condylobasal length 16 to 19 mm.; condylocanine length 15 to 17 mm. 5

4 Size smaller (fig. 52C); forearm usually less than 40 mm.; condylobasal length 15 mm. or less; dorsal connecting process of sella blunt (fig. 51F) *Rhinolophus hipposideros*

4′ Size larger; forearm usually more than 40 mm.; condylobasal length over 5 mm.; dorsal connecting process with short, sharply pointed protrusion *Rhinolophus lepidus* (see Chapter 12)

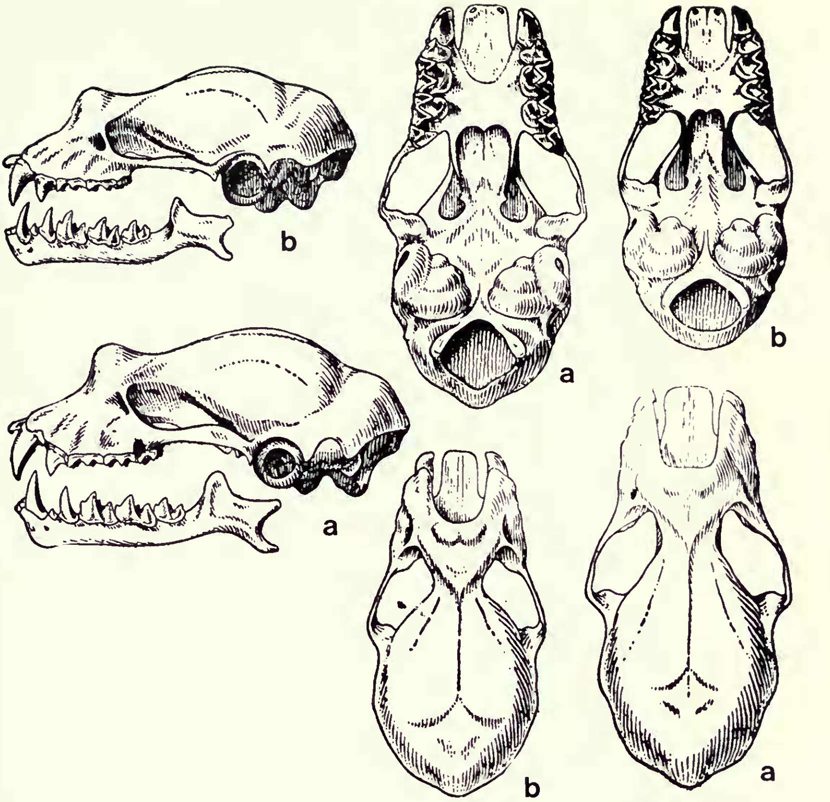

FIG. 49. The skulls of: **a,** *Rhinolophus ferrumequinum*; and **b,** *R. bocharicus* (Kuzyakin, 1950).

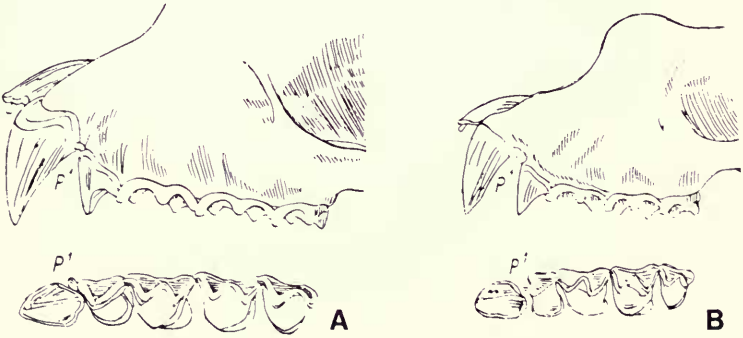

FIG. 50. Maxillary tooth rows of: **A,** *Rhinolophus ferrumequinum* illustrating P^1 displaced labially from the tooth row; and **B,** *R. euryale* illustrating P^1 in the tooth row (Gromov, 1963).

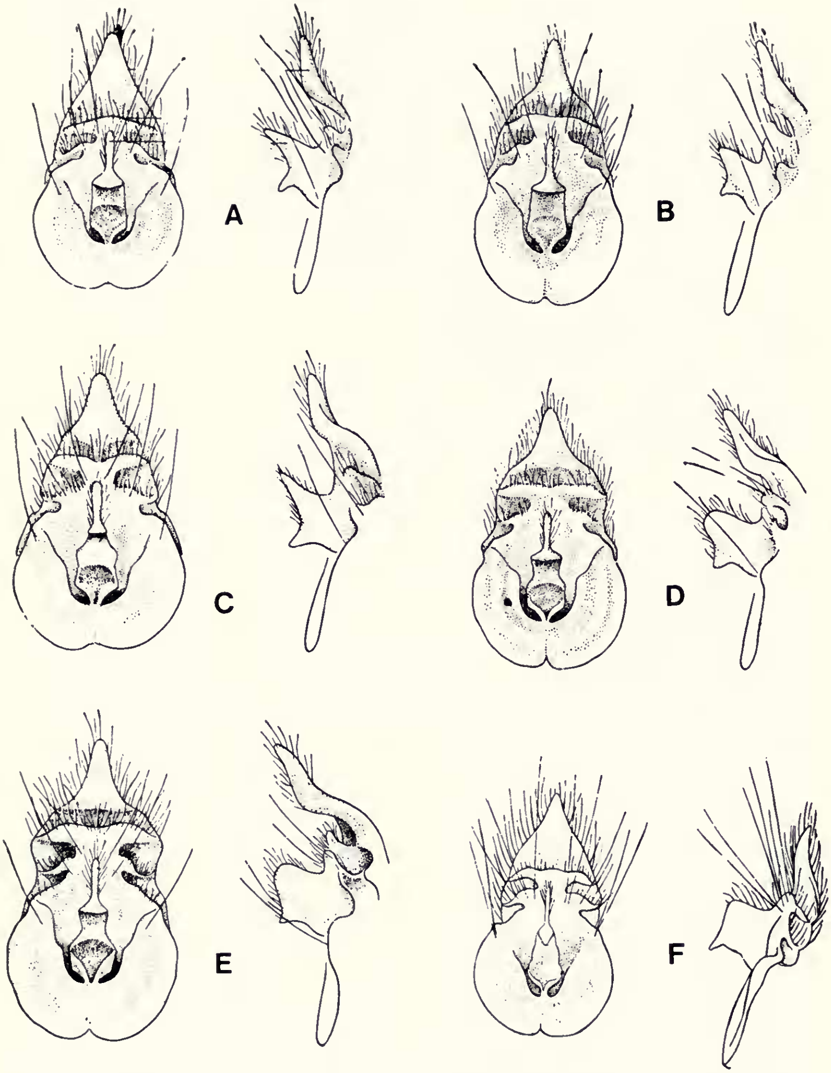

FIG. 51. Anterior and lateral views of the noseleafs of: **A,** *Rhinolophus euryale*; **B,** *R. mehelyi*; **C,** *R. blasii*; **D,** *R. bocharicus*; **E,** *R. ferrumequinum*; and **F,** *R. hipposideros* (Gromov, 1963).

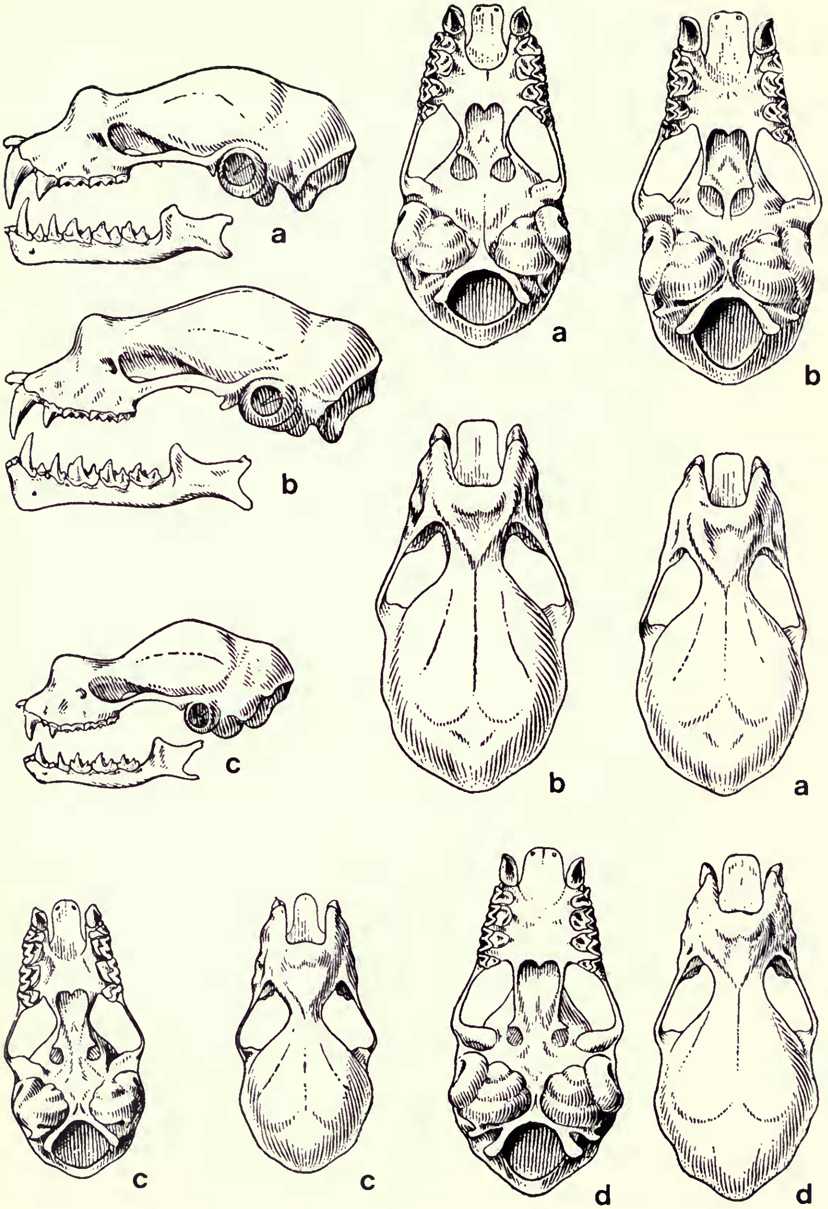

FIG. 52. Dorsal, ventral, and lateral views of the skulls of: **a,** *Rhinolophus euryale*; **b,** *R. mehelyi*; and **c,** *R. hipposideros*. Dorsal and ventral views of: **d,** *R. blasii* (Kuzyakin, 1950).

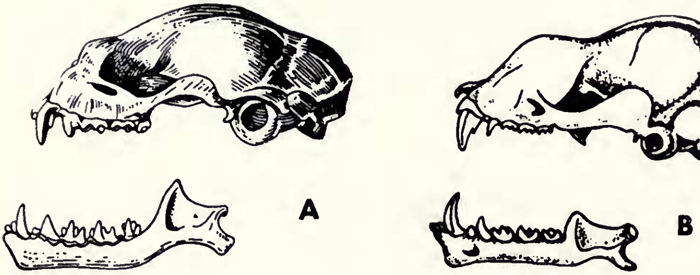

FIG. 53. The skulls of: **A,** *Asellia tridens* (Panouse, 1951), and **B,** *Triaenops persicus* (Harrison, 1964).

5 First upper premolar displaced labially from toothrow (fig. 50A) or absent (fig. 49B); dorsal connecting process of sella blunt (fig. 51D) . . . *Rhinolophus bocharicus*

5′ First upper premolar in toothrow (fig. 50B); dorsal connecting process of sella long and pointed in lateral view (fig. 51A-C) 6

6 Base of sella in anterior view triangular, anterior projection of sella tapered and somewhat pointed (fig. 51C); horseshoe more than 7.1 mm. wide; first phalanx of fourth digit more than half the length of second phalanx; first and third lower premolars approximately equal in crown area . . . . *Rhinolophus blasii*

6′ Base of sella in anterior view with nearly parallel sides, anterior projection of sella broadly rounded (fig. 51A, B); horseshoe less than 7.1 mm. wide; first phalanx of fourth digit less than half the length of the second phalanx; third lower premolar with a slightly larger crown area than the first lower premolar 7

7 Lancet tapering abruptly, distal portion linear (fig. 51B); skull larger (fig. 52B); greatest length 19.4 to 20.0 mm.; zygomatic width 10.0 to 10.5 mm.; mandible length 12.4 to 13.1 mm. . . . . *Rhinolophus mehelyi*

7′ Lancet essentially triangular, with a gradual and even taper from near the base to the apex (fig. 51A); skull smaller (fig. 52A); greatest length 18.2 to 19.1 mm.; zygomatic width 9.0 to 9.6 mm.; mandible length 11.6 to 12.1 mm.
Rhinolophus euryale

8 Dorsalmost flap of noseleaf a single flat-topped structure (similar to fig. 48B)
Hipposideros fulvus
(see Chapter 12)

8′ Dorsalmost flap of noseleaf divided into three dorsally projecting pointed structures (fig. 48A, C) 9

9 Pinna with a conspicuous notch on the inner margin; noseleaf with three long vertical projections (fig. 48C); spicule of bone projecting transversely into the wing membrane from the base of the distal phalanx of the third digit; a very small first upper premolar present (fig. 53B) . . . . *Triaenops persicus*

9′ Pinna without notch on inner margin; noseleaf with three short vertical projections (fig. 48A); no spicule of bone projecting from phalanges into wing membrane; the first upper premolar absent (fig. 53A) . . . . *Asellia tridens*

Rhinolophus ferrumequinum (Schreber)

Vespertilio ferrum-equinum Schreber, 1774, Die Säugeth. I, pl. 62 upper figs., text, p. 174.

Type Locality.—France

General Range:

Algeria and Morocco (Hayman and Hill, 1971, p. 23). Throughout southern Europe from Portugal to Thrace and north to southern England, the Netherlands, Southern Germany, Austria, and Czechoslovakia (van den Brink, 1968, p. 51). Turkey (Çağlar, 1965). The Mediterranean coastal region from Turkey to Israel and Jordan, northeastern Iraq (Harrison, 1964, p. 79). The Ukraine, the Crimea, the Caucasus, Turkmeniya, Uzbekistan, and southern Kazakhstan in the USSR (Bobrinskii et al., 1965, Map 19). Afghanistan (Gaisler, 1970, p. 17). Pakistan (Mirza, 1965, p. 205; Roberts, 1977, p. 53). Kashmir, Kumaon, Nepal, Sikkim, and China (Ellerman and Morrison-Scott, 1951, p. 111). Korea (Won, 1961, p. 50). Japan (Wallin, 1969, p. 248).

Iranian Distribution:

Records of *R. ferrumequinum* from Iran are listed on Table 7 and mapped in Figure 54. *Rhinolophus ferrumequinum* has been collected from many locations in Iran. Because of these records and those in adjoining countries, this species could be expected to occur everywhere in Iran, with the probable exception of the Khuzistan Plain, the central deserts, and Baluchistan.

Subspecies:

Rhinolophus ferrumequinum irani Cheesman

Rhinolophus ferrum-equinum irani Cheesman, 1921, Jour. Bombay Nat. Hist. Soc., **27** (3), pp. 575-576.

Type Locality.—Shiraz, Iran, 5,200 ft.

Holotype.—Adult female, BM 20.2.9.2, collected 21 June 1919.

Range.—Iraqi Kurdistan, eastern Turkey(?), eastern Transcaucasia, Iran, Turkmeniya, Uzbekistan, southern Kazakhstan, Afghanistan, and Pakistan.

Cheesman in 1921 described the form *R. f. irani* from Shiraz and attributed the Torbat-e-Heydariyeh specimen to this form. Misonne (1959) mentioned Cheesman's Shiraz records and included the

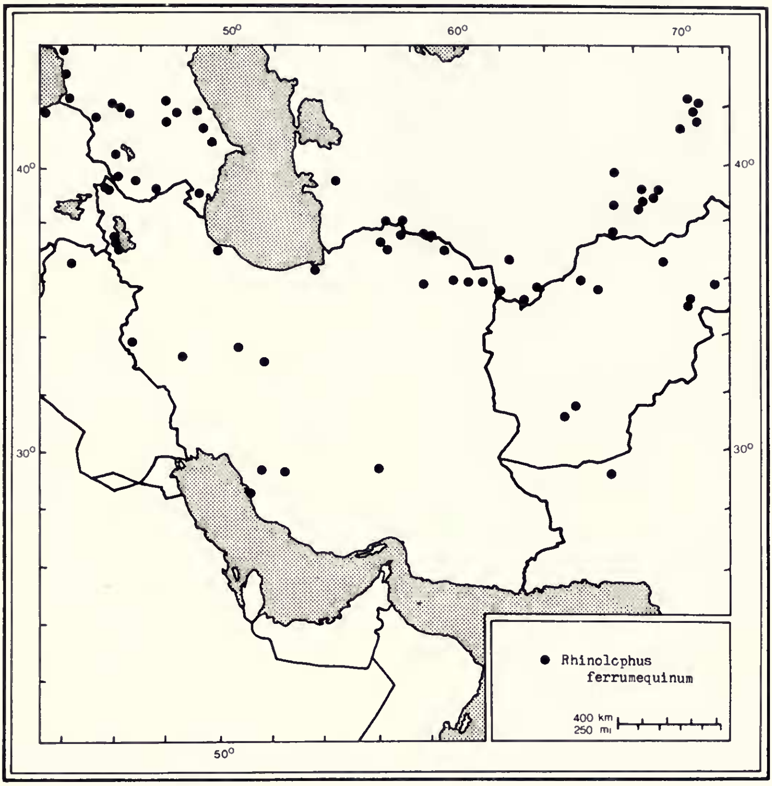

FIG. 54. Distribution of *Rhinolophus ferrumequinum.*

Bushehr specimen in *R. f. irani.* He did not mention the Torbat-e-Heydariyeh specimen. Etemad (1967, p. 276) listed his specimens from Mozduran Cave, Shandiz village, Shahpur Cave, Azad-Khan Cave, and Baba-djabar Cave as *R. f. irani.*

Harrison (1964, p. 79) assigned the single specimen from Iraqi Kurdistan to this form and Mirza (1965, p. 205) listed five specimens from Nushki, Baluchistan, Pakistan, as *R. f. irani.* Aellen (1959, p. 362) listed *R. f. irani* as the *"Forme de la Perse, de l'Afghanistan et probablement aussi du Turkestan russe."* He gave *R. f. ferrumequinum* as the *"Forme de l'Europe moyenne s'etendant a l'E jusqu'en Perse occidentale*(?)." However the Soviet authors disagreed, and Bobrinskii et al. (1965, p. 88) listed *R. f. ferrumequinum* from the European portion of the USSR and the western Caucasus,

TABLE 7. Records of *Rhinolophus ferrumequinum* in Iran

Source	**Locality**	**Prov.**	**No.**	**Sex**	**Date Collected**	**Specimens Examined**	**Remarks/ Ecological Notes**
Gmelin (1774)	Elburz Mts., near Rasht	GIL	—	—	—	—	Pallas (1778, p. 125) cites S. G. Gmelin. Locality restricted to Rasht by Lay (1967, p. 138).
Murray (1884, p. 98)	Bushire (= Bushehr)	BSH	—	—	—	—	Specimen in "Kurrachee Museum."
Cheesman (1921, p. 575)	Shiraz	FAR	9	2♂ 3♀ 1 ?	21 June 1919	BM 20.2.9.1-5	Includes holotype of *R. f. irani*. 1 adult ♀, others immature.
	Turbat-i-Haidari (= Torbat-e-Heydariyeh)	KHR	—	1 ?	"15 11 10"	BM 10.6.29.1	Numbers "15 11 10" on tag seems to indicate 15 Nov. 1910, but catalog number indicates processing on 29 June 1910.
Etemad (1967, p. 276)	Mozduran Cave, 110 km. E Meshhad (= Mashhad)	KHR	1	1 ?	—	—	
	Shandiz Village, 34 km. W Meshhad (= Mashhad)	KHR	2	2♂	19 Aug. 1963	IUM 38952	
	Azad Khan Cave, Mahalat (= Mahallat)	CEN	1	1♀	—	—	
	Baba-djaber Cave, Mahalat (= Mahallat)	CEN	—	—	—	—	
	Shapaur (= Shahpur) Cave	FAR	1	1♂	—	—	
Lay (1967, p. 138)	Maku	WAZ	1	1♂	Sept. 1962	FMNH 96562	Purchased—said to have been collected "in town."
	6 km. E Maku	WAZ	1	1♂	28 Sept. 1962	FMNH 96560	Hanging in small, dry dark cave.
	Robat-i-Qarabil	KHR	6	3♂ 3♀	9 Nov. 1962	FMNH 96629-34	"Considerable numbers" hibernating in qanat.

TABLE 7. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Lay (1967, p. 138).	Chaman Bid	KHR	9	5♂ 4♀	13 Nov. 1962	FMNH 96640-48	"Considerable numbers" hibernating in qanat.
	Ganjah Kuh Cave	KHR	4	1♂ 3♀	12 Nov. 1962	FMNH 96636-9	"Considerable numbers" hibernating in large wet cave; "never hung in clusters."
	Galateppeh	ESN	1	1♂	21 Dec. 1962	FMNH 96649	In a warm, wet qanat.
Farhang-Azad (1969, p. 730)	Chelmir	KHR	1	1♂	16 July 1968	IPHR 718	Mistnetted over stream in small forest.
Farhang-Azad (1970)	71 km. SE Mashhad	KHR	4	1♂ 3♀	29 July 1969	IPHR 1027-30	1♀ adult, others immature.
Farhang-Azad (1971)	20 km. S Rezaiyeh	WAZ	3	1♂ 2♀	28 Aug. 1970	IPHR 3127-8	
Felten (in press)	Mozduran	KHR	2	2♂	4 Oct. 1974	—	Cave? SMF 46678-9 (Felten, pers. comm., 1975).
New Records	16.1 km. NNW Rezaiyeh	WAZ	4	1♂ 3♀	4 Aug. 1968	FMNH 111194-7	12 to 15 found in small wet cave. 1♂ and 1♀ immature.
	13.7 km. SW Rezaiyeh	WAZ	1	1♀	4 Aug. 1968	FMNH 111198	Purchased—said to have come from a cave. Immature.
	Mar Ab Canyon, 57 km. W Shahabad on Baghdad Rd.	KRS	23	14♂ 8♀ 1 ?	25 Aug. 1968	FMNH 111199-221	90 seen hanging under huge jumbled boulders.
	3.2 km. N Khurramabad	LOR	3	1♂ 2♀	13 Sept. 1968	FMNH 111222-4	12 hung singly in small, dark, damp passage of cave.
	Shahpur Cave	FAR	3	2♂ 1♀	9 Oct. 1968	FMNH 111191-3	Found in torpor in this large cave.
	About 50 km. E Sa'idabad	KRM	1	1♀	6 Dec. 1968	FMNH 111225	Found in deep torpor in large cave.
	Tir Tash	MAZ	9	2♂ 7♀	4 Sept. 1970	MMTT (2 uncat.) BM 71.1638-44	Loft of Tobacco Institute.

and listed *R. f. proximus* Andersen 1905 from eastern Transcaucasia and central Asia. Gaisler (1970, p. 18) agreed with Aellen in referring the Afghan *R. ferrumequinum* to *irani,* but pointed out that the real relationship between *R. f. irani* and *R. f. proximus* (type locality, Gilgit, Kashmir) is yet to be determined. If the two must be synonymized, *proximus* (1905) has priority over *irani* (1921).

In his original description of *irani* Cheesman (1921, p. 575) compared his new subspecies to the nominate form from Europe and to *R. f. tragatus* from India, but made no mention of *R. f. proximus.* He described *irani* as being "paler in colour and slightly longer in forearm" than the two other forms he mentioned. Andersen (1905, p. 112) compared *R. f. proximus* to *R. f. ferrumequinum* in size and said that the former has a proportionately much shorter tail and that the "horseshoe is remarkably narrow." Andersen did not mention color but since his holotype (BM 81.3.1.10), and apparently only specimen, is in alcohol this is understandable. Meyer-Oehme (1965) described a specimen from eastern Afghanistan as dark, medium-sized, with a very narrow horseshoe and short tail. He referred the specimen to *R. f. proximus.* Aellen (1959, p. 362) keyed the three forms as follows:

1	Tail short, less than 60% of the length of the forearm	*proximus*
1′	Tail long, more than 60% of the length of the forearm	2
2	Color generally pale	*irani*
2′	Color generally darker	*ferrumequinum*

Neither in this key nor in the text of his article did Aellen mention the color of *proximus.*

Of the 43 specimens from Iran in which I have examined the ratio of forearm to tail length, seven have the tail less than 60 per cent of the forearm and four have a tail that is exactly 60 per cent of the forearm. I can find no other characteristic that distinguishes these short-tailed specimens from others from Iran, and I feel that the short tail measurements are due either to natural variation or to damage. All of the Iranian (and Afghan) material that I have seen is definitely pale-colored. On the basis of Meyer-Oehme's (1965) description of his specimen of *R. f. proximus* as "dark," I retain the name *irani* in preference to *proximus* for the Iranian specimens. However, I agree with Gaisler (1970) that many more specimens (particularly of *proximus*) must be studied before the true relationship between these two forms can be clarified.

Bobrinskii et al. (1965, p. 88) listed both *R. f. ferrumequinum* and *R. f. proximus* (= *R. f. irani* in this case) from the Caucasus. Aellen (1959) said that *R. f. ferrumequinum* ranges to western Iran but followed this statement with a question mark. Cheesman (1921) differentiated *irani* from the nominate form on the basis of its longer forearm and paler color. Of the 81 specimens from Iran that I have examined, the forearms range from 52 to 62 mm. (mean 56.1 mm.). Thirty-five specimens from Lebanon, Jordan, Syria, and Israel that Harrison (1964, p. 80) listed as *R. f. ferrumequinum* have forearms ranging from 55 to 59 mm. (mean 57.2 mm.), and 26 of this form listed from western Europe by Miller (1912, p. 143) have forearms ranging from 52 to 65 mm. (mean 56.2 mm.). This seems to be clear evidence that Cheesman's (1921) character of forearm length is not valid. Harrison (1964, p. 79) is in agreement on this point.

Harrison (1964, p. 79) differentiated *R. f. irani* from the typical form on the basis of color. *Rhinolophus f. irani* is "decidedly paler in colour ... general colour above pale faun, the hair bases pale drab," while *R. f. ferrumequinum* has the "tint of the tips varying, usually light greyish or drab brown. . . . Some individuals are a distinctly paler sepia tint, others are paler, more buffy brown and occasionally brighter tints are seen."

In examining color of the specimens from the Street Expeditions, I noted that the specimens collected by the 1968 Expedition to Iran (all from the south and western portion of that country) are decidedly grayer than the reddish specimens collected in northern and eastern Iran by the 1962 Expedition and those collected in Afghanistan by the 1965 Street Expedition. Since immatures of many bat species are grayer than the typical adult, I confirmed the fact that the series from all three expeditions contained both young of the year and full adults. The color difference I observed could not be due to biological age of the specimens. The only two dry specimens of *R. f. ferrumequinum* from the Arabian Peninsula available for comparison at Field Museum are a female collected on 18 October 1964 at Jerash, Jordan, and a female collected 2 km. NE Hozmiye, Lebanon, on 13 August 1960. One of these was very similar in color to those from the 1968 Street Expedition and the other very similar to those from the 1962 Street Expedition.

J. E. Hill of the British Museum kindly agreed to receive three randomly selected specimens from the Zagros Mountains collected

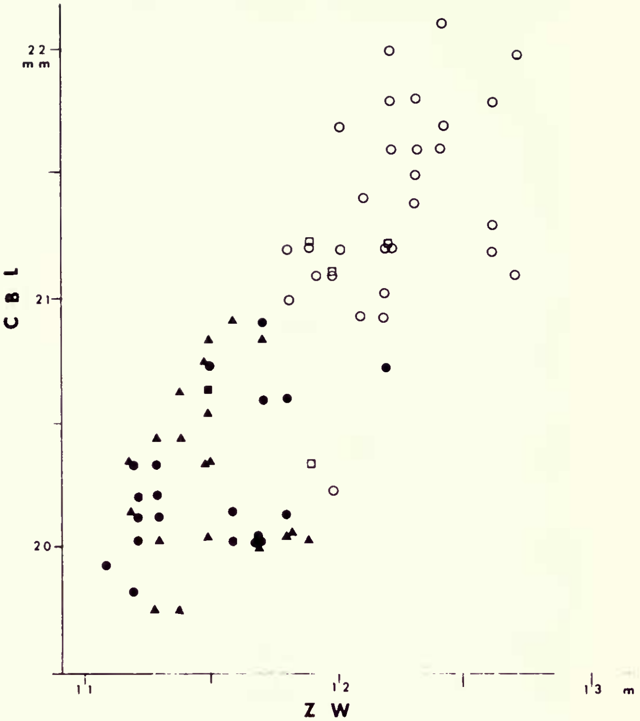

FIG. 55. Condylobasal length (CBL) versus zygomatic width (ZW) of *Rhinolophus ferrumequinum*. A clear difference can be seen between the cranial size of *R. f. ferrumequinum* (open figures) and *R. f. irani* (solid figures). The two open figures with CBL below 20.5 mm. may be immature specimens. Key: open circles = *R. f. ferrumequinum*, Arabian Peninsula (Harrison, 1965); open squares = *R. f. ferrumequinum*, Turkey; solid circles = *R. f. irani*, Iran; solid squares = *R. f. irani*, Pakistan; solid triangles = *R. f. irani*, Afghanistan.

by the 1968 Expedition and three similarly selected specimens from northeast Iran collected by the 1962 Expedition and to compare these with the holotype and topotypes from Shiraz (in the Zagros Mountains) in the collections of the British Museum. He noted:

> In colour the holotype and original series most closely resemble the specimens obtained in 1962 at localities other than the Zagros Mountains. . . . The three specimens from localities in the Zagros Mountains . . . are slightly greyer than the holotype and the original series, with darker, greyer membranes. . . . I . . . conclude therefore that one is faced with a case of "foxing," the degree of grey remaining being dependent on the historic age of the specimen. (Hill, pers. comm. 1970)

Thus while specimens of *R. f. irani* do appear to be paler in color than the typical race, particularly those from Europe, potential color change of dry specimens presents a problem in accurate comparison of museum specimens.

Rhinolophus f. irani does, however, have a smaller skull than *R. f. ferrumequinum* in Asia. This is particularly conspicuous in the condylobasal length. Twenty-three specimens of *R. f. irani* from Iran had a range from 19.8 to 20.9 mm. with a mean of 20.3 mm., while 27 *R. f. ferrumequinum* from Lebanon, Jordan, and Israel have a range of 20.9 to 21.8 mm. with a mean of 21.4 mm. (Harrison, 1964). A single specimen included in Harrison's list (excluded from the above calculations) has a condylobasal length of 20.3 mm. I am assuming that this is an immature specimen.

Figure 55 is a scatter diagram plotting condylobasal length against zygomatic width for 21 specimens of *R. f. irani* from Iran, 21 from Afghanistan and one from West Pakistan, as well as four *R. f. ferrumequinum* from Turkey and 28 from the Arabian Peninsula (26 of these based upon data from Harrison, 1964, p. 81). The two *R. f. ferrumequinum* that fall into the range of *R. f. irani* are probably immature specimens. It should be noted that the Iran series includes a specimen from Maku, very close to the Turkish border, and the Turkish series includes two specimens from Trabzon, the easternmost site presently reported for the species in that country. Each of these three specimens falls well within the cluster for its form, and thus the contact point for the two subspecies must be in Turkey east of Trabzon.

Specimens Examined:

In addition to the Iran specimens for which catalog numbers are given in Table 7, I have examined 49 *R. f. irani* from five localities in Afghanistan (FMNH 102354, 102365-81, 102389-408), one from Transcaspian USSR (BM 94.8.7.29), and one from Nushki, Baluchistan, Pakistan (BM 64.45).

I have also examined a *R. f. ferrumequinum* from Beth Nativ, Israel (FMNH 75789); one from Jarash, Jordan (FMNH 99558); one from 2 km. NE Hozmiye, Lebanon (FMNH 99559); 11 from four different localities in Turkey (FMNH 74445-6; BM 6.3.6.1-3, 6.3.6.226, 8.7.1.1-3, 66.166-7); and two from Appen, Ligure, Italy (OSU 8662-3). In addition I have examined other subspecies of *R. ferrumequinum* from Britain (FMNH 35944) and India (FMNH 29480, 48566, 65388, 65390).

Ecological Notes:

The 1968 Street Expedition found *R. ferrumequinum* hibernating in qanats (underground irrigation ditches) in the vicinity of Shahrabad Kaur on 9 and 13 November and in a large cave in Ganjah Kuh on 12 November. Concerning Ganjah Kuh Cave Lay (1967, p. 138) said, "*R. ferrumequinum* hibernated, but never hung in clusters." He did not describe their roosting habits in the qanat, but by this statement implied that there they were found in clusters. Sex ratios from these sites are approximately 1:1 male to female. *Rhinolophus blasii* was found with this species in both the qanat and the cave and *Miniopterus schreibersi* was also found in the cave.

The 1968 Street Expedition first encountered *R. ferrumequinum* 16 km. NNW Rezaiyeh on 4 August. About 12 to 15 of these bats were observed at the rear of a small wet cave. With a mistnet and hand nets we captured two adult females, one immature male, and one immature female. Dim light from the entrance was visible in all parts of the cave. From the sex and age structure of the sample and from the size and activity of the population, I assume that this was a nursery colony. Later the same day a boy brought a single immature female of this species into our camp 13.7 km. SE Rezaiyeh. He had captured it in a cave "about an hour's walk from camp" but our staff got no further data and I was unable to locate this cave. I presume that it was another nursery colony.

On 24 August I visited a large canyon near the Baghdad Highway 57.1 km. W of Shahabad. One narrow steep-sided section of this canyon, through which a stream named Mar Ab flows, is filled with a jumble of huge boulders (fig. 56), the largest of which are the size of small houses. As we approached one of these boulder piles, about 100 bats flew out of the space at the base of a pile (spaces ranging to 20 ft. in height) and flew to another pile. For about an hour three representatives of the Iran Department of Game and Fish and I chased this population among the boulders, occasionally collecting a bat with a handnet or knocking one from the air with a tree branch as the bats darted between the rocks. We collected two *R. ferrumequinum* and two *Myotis emarginatus* by this method. Although I never saw a bat hanging up, several small guano piles (30 to 60 cm. in diameter and about 2 cm. deep) on the sandy stream bed indicated the roosting sites on the jumbled rocks above. We retired to a small pool and waterfall downstream and allowed the bats to settle down. Then one of the Game and Fish Department hunters, skilled in

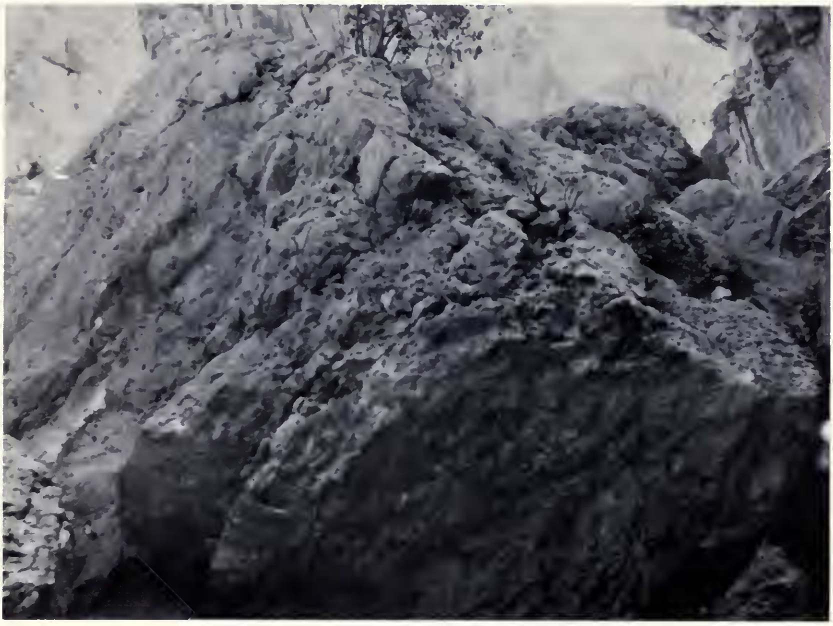

FIG. 56. Boulders in Mar Ab canyon.

stalking big game, quietly approached the rocks and with a single shot from his shotgun collected 21 *R. ferrumequinum*. The sample of this species from the site included 12 females, nine males, and two individuals too mangled for sex to be determined. The guano deposits were not large enough to indicate the presence of these bats throughout the summer and the rocks are too exposed for a hibernaculum. I assume that this locality is used as a temporary roosting site after the breeding season and before hibernation. Of the approximately 100 bats originally seen I estimate by size and flight pattern that about 90 per cent were *R. ferrumequinum*.

On 13 September we observed about 12 of this species in a cave 3.2 km. N Khurramabad. The bats hung singly along a small, dark, damp passage terminating in a small chamber into which light filtered through spaces between jumbled rocks. The bats flew about in the chamber but did not use any of these spaces to escape to the exterior. Two females and one male were collected. All appear to be adults. Guano accumulations were not noticed in this portion of the cave; however, a second, large chamber, in which several hundred *Myotis blythi* were found, contained a great deal of guano. I believe that the smaller passage is used by *R. ferrumequinum* as a roosting site after the breeding season and perhaps as a minor hibernaculum.

On 9 October the 1968 Street Expedition visited Shahpur Cave. On this date we found one male and one female *R. ferrumequinum* hanging together in deep torpor in a room that contained large numbers of *Miniopterus schreibersi* and a few *Myotis capaccinii*. Another male, also in deep torpor, was collected from another part of the cave. When the 1962 Street Expedition visited this cave on 29 December, no *R. ferrumequinum* were found (Lay, 1967). Etemad (1967) reported this species from Shahpur Cave but unfortunately gave no date. I must assume that while this huge cavern is used as a prehibernation roost, it is not used as a hibernaculum.

On 6 December 1968 I visited a large, intricate cave about 50 km. E Sa'idabad. A great deal of guano from at least two species of bats was found, but only two bats were observed. One female *R. ferrumequinum* was collected from where it hung in deep torpor on the wall in the twilight zone, but in an area noticeably warmer than the entrance area. A second bat, which appeared to be the same species, was seen flying but was not collected.

To summarize, in Iran *R. ferrumequinum* has been found in torpor in qanats on 9 and 13 November and 21 December 1962, and in caves on 12 November 1962, and 4 and 9 October and 6 December 1968. Active populations have been found on 4 and 24 August and 13 September. Hibernation apparently begins in late September. Small, damp, relatively light caves seem to be preferred as nursery sites, larger caves and jumbled boulders are utilized as temporary roosts, and large caves and qanats are utilized as hibernacula. The only habitats that have been described for the species in Iran include natural and man-made caves and cavernous spaces under boulders.

Rhinolophus bocharicus Kastschenko and Akimov

Rhinolophus bocharicus Kastschenko and Akimov, 1917, Ann. Mus. Zool. Acad. Sci. Russ., 22, p. 221.

Type Locality.—Murghab River, South Soviet Turkestan.

General Range:

Turkmeniya and Uzbekistan in the USSR (Bobrinskii et al., 1965). Northern Afghanistan (Aellen, 1959, pp. 362-63). Northeastern Iran (Farhang-Azad, 1969, p. 730). Azarbaijan, USSR (Gubareff, 1941).

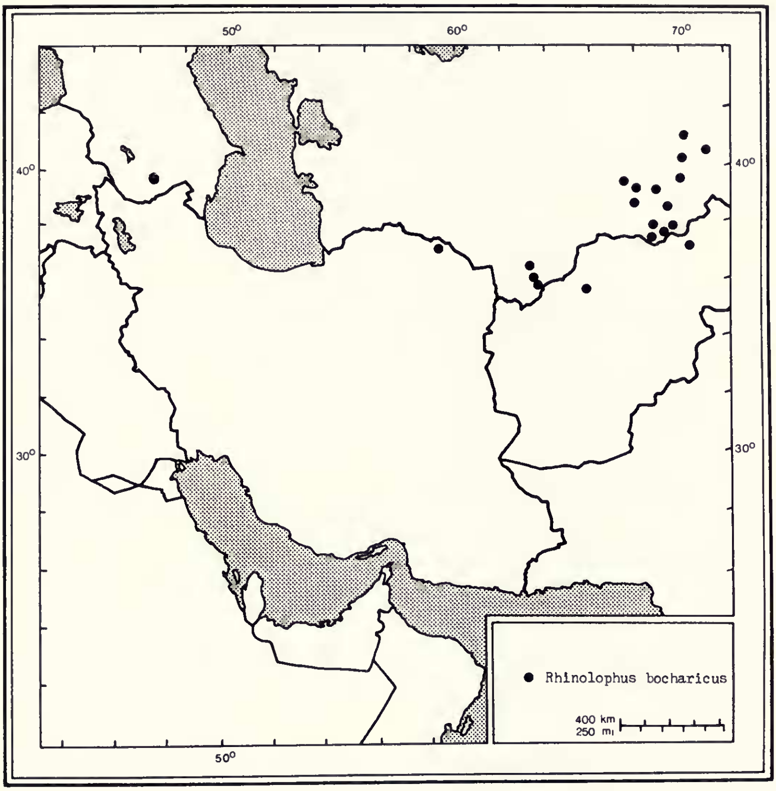

FIG. 57. Distribution of *Rhinolophus bocharicus.*

Iranian Distribution:

Farhang-Azad (1969, p. 730) reported the only known Iranian specimen from Chelmir, Khorasan Province (fig. 57). In June, 1974, I examined this specimen in the collections of the Public Health Research Collections (uncataloged). It is a very young female with epiphyses of the phalanges, the metacarpals, and even the radius and ulna completely separated from the bone shaft by soft cartilage. The first upper premolar is absent. Measurements for this specimen and ones from Afghanistan and the USSR are given in Table 8. Even though the Iranian specimen is very immature, it is well within the size range of the other specimens and in certain dimensions (e.g., FA and CBL) is one of the largest specimens listed. It is possible that this specimen is only an immature *R. ferrumequinum,* and it should

TABLE 8. Measurements of *Rhinolophus bocharicus* in central Asia

Measure	**Iran**[1]	**Afghanistan**[2]	**U.S.S.R.**[3]
TL	82.0		81.2 (6) 79.0-85.4
HB	53.0		53.3 (6) 51.7-56.2
T	29.0	25 (2) 24-26	27.9 (6) 25.7-29.2
HF	11.0	11.2 (2) 11-11.5	10.9 (6) 10.3-11.2
E	15.9	21 (2) 20-22	24.8 (6) 22.3-34.3
FA	52.0	50.8 (2) 50-51.7	51.8 (6) 49.9-52.6
CBL	18.1	17.1	18.0 (6) 17.9-18.1
ZW	9.5	10.3	10.4 (6) 10.2-10.8
PO	2.4	2.5	3.0 (6) 2.8-3.2
C-M^3	7.8	7.0	7.1 (6) 6.9-7.2
C-M$_3$	9.8	7.5	
ML	12.8	12.8	

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[1] Farhang-Azad (1969)

[2] FMNH 102364, plus measurements from Aellen (1959)

[3] Ognev (1928)

be closely compared with immature *R. bocharicus* from the USSR as well as with immature *R. ferrumequinum*. Distribution records of *R. bocharicus* in the USSR and Afghanistan (fig. 57) indicate that this species could be expected in much of northern and eastern Khorasan Province.

Aellen (1959) stated his belief that *R. bocharicus* is a subspecies of *R. clivosus* Cretzschmar, 1828. Both Bobrinskii et al. (1965) and Farhang-Azad (1969) regarded *R. bocharicus* as a full species and Hanak (1969) and Strelkov (1971) gave strong arguments for its specific status. Yet Gaisler (1971) listed the Afghanistan specimen as *R. c. bocharicus*. The closest records of *R. clivosus* to the range of *R. bocharicus* are from southern Israel and the Hadramaut. If *R.*

bocharicus is indeed conspecific with *R. clivosus* then it should also occur in the large hiatus that now exists between the two known populations and thus should occur throughout Iran. If the two forms are considered to be specifically distinct there is no reason to expect *R. bocharicus* in southern Iran. If Gubareff's (1941) report from Azarbaijan is incorrect, there is no reason to expect *R. bocharicus* anywhere in Iran except in the northeast.

Subspecies:

Ellerman and Morrison-Scott (1965, p. 742a) included in their second edition a list of names overlooked in the first printing. These include a reference to *Rhinolophus bocharicus rubiginosus* described by Gubareff (1941, pp. 287, 289, 290). The type locality is given as "Transcaucasia, Shusha, Azerbaijan S.S.R., 1,200 metres." Bobrinskii et al. (1965) do not mention this subspecies of *R. bocharicus* nor do they include this paper in their bibliography.

Since the only known specimen of *R. bocharicus* from Iran is from the northeastern corner of the country, this specimen should be considered to be the nominate form. If Gubareff is correct in reporting *R. bocharicus* from Transcaucasia, it is quite possible that it also occurs in northwestern Iran. It is also likely that the *R. bocharicus* from this area are subspecifically distinct from the nominate form.

Specimens Examined:

I have examined the one specimen from Iran mentioned above and an adult female from 4.4 miles E Taliq-an, Pakhar Province, Afghanistan (FMNH 102364).

Ecological Notes:

The only Iran specimen is an immature female mistnetted over a stream in July, 1968 (Farhang-Azad, 1969, p. 730). One Afghanistan specimen came from a cave (Aellen, 1959, p. 362); the other was found mummified in a crack in a wall around a house (Neuhauser, 1969, p. 53).

Bobrinskii et al. (1944, pp. 68-69) stated that during the summer *R. bocharicus* inhabits dark, damp loess caves. It usually occurs in colonies of up to 200-300 individuals but in autumn these colonies may reach 600. The males and females remain together and solitary individuals are rare. Some of the individuals spend the winter in the same caves they used during the summer, while others migrate to Afghanistan for the winter.

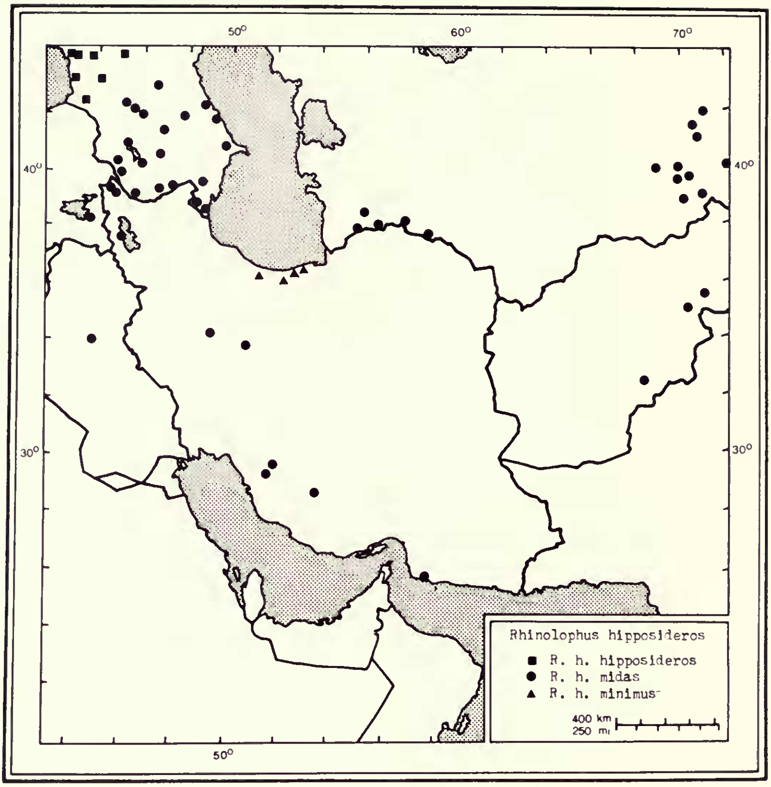

FIG. 58. Distribution of *Rhinolophus hipposideros*.

Rhinolophus hipposideros Bechstein, 1800

Vespertilio hipposideros Bechstein. 1800 *In* Thomas Pennant Allgemeine Uebersicht der Vierfüssigen Thiere, 2, p. 629.

Type Locality.—France.

General Range:

Morocco, Sudan, Ethiopia, and Eritrea (Hayman and Hill, 1971, p. 22). Europe from Portugal and Ireland to the Ukraine and Poland (van den Brink, 1968, p. 51). Sinai, the Levant, Baghdad, and the Red Sea coast of Arabia (Harrison, 1964, p. 86). Turkey (Çağlar, 1965, p. 126). The Ukraine, the Caucasus, Turkmeniya, Uzbekistan, Tadzhikistan, and southern Kazakhstan (Bobrinskii et al., 1965, Map 17). Afghanistan (Aellen, 1959; Gaisler, 1970, p. 20). Pakistan (Roberts, 1977, p. 55). Kashmir (Gaisler, 1970, p. 21).

Iranian Distribution:

Iranian records of *R. hipposideros* are listed in Table 9 and mapped on Figure 58. Misonne (1959) attributed to Satunin (1905) records of this species from Lenkoran and in the Valley of the Araxe (=Aras) in the north of Iranian Azarbaijan. However, the only specimen Satunin (1906) mentioned was from Lenkoran, which is in Soviet Azarbaijan. These records for Iran and adjoining countries indicate that this species may be found in all parts of Iran, with the possible exception of the central desert.

Subspecies:

Rhinolophus hipposideros midas Andersen

Rhinolophus midas Andersen, 1905, Proc. Zool. Soc., London, **1905**, Vol. 2, p. 138.

Type Locality.—Jask, Persian Gulf, Iran.

Holotype.—Adult ♂ BM 94.11.16.1 in spirit, skull extracted.

Range.—From Baghdad, Iraq, through Iran south of the Elburz, Transcaucasian and Transcaspian USSR, to central Afghanistan. Perhaps into eastern Turkey.

Rhinolophus hipposideros subsp. (see below)

Three subspecies of *R. hipposideros* have been reported in Iran.[1] Andersen (1905, p. 138) described the form "*Rhinolophus midas, sp. n.*" from "Jask, Persian Gulf." Later he included *midas* as a subspecies of *R. hipposideros* (Andersen, 1918). In the 1905 paper he also mentioned a specimen from "Urmi, NW Persia" (=Rezaiyeh) and included it in his list of *R. h. hipposideros.*

Misonne (1959) listed *R. h. hipposideros* from the Valley of the Araxe (=Aras) River in the Iranian Azarbaijan on the basis of Satunin's (1906, not 1905 as cited) record of *R. hipposideros* from Soviet Azarbaijan. Misonne also mentioned the Jask specimen and referred to it as *R. h. midas.*

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[1] In an earlier version of this monograph, an unpublished Ph.D. dissertation, Oklahoma State University, 1972, I described a new subspecies of *R. hipposideros.* After re-examination of the holotype of *R. h. midas,* I now consider that described form invalid.

Table 9. Records of *Rhinolophus hipposideros* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
Andersen (1905)	Jask	COS	1	1♀	—	*midas*	BM 94.11.16.1	Holotype of *R. h. midas.*
	Urmi (= Rezaiyeh)	WAZ	1	1♂	—	*midas*	BM 99.9.13.2	Adult
Kuzyakin (1950, p. 210)	Rezaiyeh (Lay, 1967, p. 137)	WAZ	—	—	—	*midas*	—	May be above specimen.
Etemad (1967)	Azad Khan Cave *nr.* Mahalat (= Mahallat)	CEN	2	1♂ 1♀	—	*midas*	—	Cave
	Asporis Village *nr.* Sari	MAZ	1	1 ?	—	*minimus?*	—	Colony found in a kiln.
Lay (1967, p. 137)	12 km. W, 2 km. S Chalus	MAZ	17	5♂ 12♀	4 to 6 Sept. 1962	*minimus?*	FMNH 96650-66	10 adult females, others young of year.
	8 km. NW Maku	WAZ	1	1♀	29 Sept. 1962	*midas*	FMNH 96667	Adult from small dry cave.
Farhang-Azad (1971)	2 km. E Maku	WAZ	20	6♂ 15♀	22 Aug. 1970	*midas*	IPHR 3022-41	8♀lactating; 6♂ and 6♀immature.
New Records	14.5 km. NE Kermanshah	KRS	1	1♂	20 Aug. 1968	*midas*	FMNH 111188	Flew into open window of moving jeep.
	Shahpur Cave	FAS	5	5♀	9 Oct. 1968	*midas*	FMNH 111183-7	Hanging exposed in cave.
	Canae Gabru Cave *nr.* Tadovan	FAS	2	1♂ 1♀	10 Nov. 1968	*midas*	FMNH 111189-90	Hanging exposed in cave.
	Barforoush (= Babol)	MAZ	1	1♂	5 July 1927	*minimus?*	BM 27.10.26.1	Immature. "house of the Imperial Bank of Persia."
	Location unknown	MAZ?	1	1♂	1970?	*minimus?*	MMTT uncat.	
	10 km. SE Kazerun	FAS	4	4♂	18 and 20 Nov. 1963	*midas*	USNM 350138-41	
	Tamishan; 20 km. W Mahmudabad	MAZ	25	2♂ 2♀	21 June 1963	*minimus?*	USNM 340949-52	1♂ & 1♀prevolant.

Etemad (1967, p. 277) stated that "*Rhinolophus h. hipposideros* from Azarbaijan near Aras River northwest Iran and *Rhinolophus hipposideros midas* from Jask, Persian Gulf, have been recorded before." Presumably the Aras River record referred to is from Misonne (1959) or Satunin (1906), though neither of these authors was listed in Etemad's bibliography. Etemad (1967, p. 277) then reported specimens from Sari and Mahallat that had been identified as *R. h. minimus* by D. L. Harrison. But Etemad did not give Harrison's reasons for this identification. Lay (1967) did not attempt to designate subspecies for his specimens from Maku or Chalus.

Andersen (1905) distinguished *R. h. midas* from *R. h. hipposideros* and *R. h. minimus* on the basis of sella shape and stated that the sella of *midas* in anterior view is deltoid, approximating an equilateral triangle, while in the other two forms this structure is narrow and parallel-sided. He distinguished *R. h. hipposideros* from *R. h. minimus* and *R. h. midas* on the basis of size. *R. h. minimus* differs from *R. h. hipposideros* in "being in every respect smaller; in some respects, as it seems, absolutely smaller, in others at least on the average" while *R. h. midas* is, "in width of the braincase as well as in external dimensions," like *R. h. minimus*.

In the 1905 paper Andersen listed *R. h. midas* only from the type locality, *R. h. minimus* from the Mediterranean Subregion, and *R. h. hipposideros* from the extreme northwest Himalayas, through northwest Persia and Armenia, and over the whole of Central Europe north of the Balkans and the Alps. In 1918 he modified this, giving a range for *R. h. midas* from Gilgit (the record on which the northwest Himalayas were included under *R. h. hipposideros* in 1905) to Cyprus. "NW Persia" was left as the easternmost locality for *R. h. hipposideros* (Andersen, 1918).

Recent authors have modified this somewhat. Harrison (1964, p. 86) recognized *R. h. minimus* from the Mediterranean and Red Sea coasts of the Arabian Peninsula and *R. h. midas* from Baghdad. He differentiated between these two on the basis of sella shape. Bobrinskii et al. (1965, p. 86) recognized *R. h. hipposideros* from the western Caucasus west to Moldavia and *R. h. midas* from eastern Transcaucasia, central Asia, and Iran. They distinguished the two forms on the basis of color, *R. h. hipposideros* having an admixture of gray tones and *R. h. midas* exhibiting an admixture of ochraceous and yellowish tones. Aellen (1959, p. 366) identified a specimen from Boulon Cave, Qalat, Afghanistan, as *R. h. midas*. He separated *R. h.*

midas from *R. h. hipposideros* on the basis of its lighter color, wider-based sella, and wider infraorbital (=zygomatic?) arch. He also stated that in his specimen P_3 is miniscule and external so that P_2 and P_4 are in contact.

Gaisler (1970, pp. 20-21) reported *R. h. midas* in Afghanistan from the vicinity of Jalalabad and from Lalanda (south of Kabul). He presented measurements of these specimens, the type of *midas,* and specimens from Iraq, Caucasia, and Asia Minor, all of which he considered to represent *R. h. midas,* as well as measurements of *R. h. hipposideros* from Czechoslovakia. He pointed out that the Asian specimens, while not fulfilling “the 75 per cent difference rule” are conspicuously smaller than the nominate, central European form. He considered the difference in dentition to be significant. In all Afghan specimens “P_2 is entirely outside the tooth row, P_1 and P_3 nearly or completely touching.” Gaisler felt that “this is in agreement with Andersen’s original description of ssp. *midas,*” which says “‘ ... P_3 external. A very narrow interspace between P_2 and P_4 ...’.” He then pointed out that in some 100 specimens of *R. h. hipposideros* that he examined he “found P_2 less markedly outside the tooth row and invariably a distinct space between P_1 and P_3” and quoted Harrison (1964) who described *R. h. minimus* as having “a small but distinct gap between pm1 and pm3.” Thus Gaisler’s “significant” character is that the Afghan specimens (“nearly or completely touching”) resemble the type description of *midas* (“a very narrow interspace”) more than the central European form (“a distinct space”) or the Mediterranean form (“a small but distinct gap”). The difference between these statements is by no means clear, and I have great difficulty believing that it is significant. I have examined 21 specimens of *R. hipposideros* for this dental characteristic, including eight specimens from six localities in Iran, nine from two localities in Afghanistan, one from Lebanon, two from Germany, and one from Switzerland. As can be seen from Table 10, this character is highly variable in populations in Iran.

I have examined all of the specimens of *R. hipposideros* from Iran with the exception of those reported by Etemad (1967) and find them easily separable into two groups on the basis of color (fig. 59), a criterion used by Bobrinskii et al., 1965 and Aellen, 1959. The specimens from Mazandaran Province are all considerably darker than the other Iranian specimens I have seen but the nine adults in the Chalus series are very similar in coloration to specimens from

TABLE 10. Arrangement of P_1, P_2 and P_3 in *Rhinolophus hipposideros*

Locality		P_2 external, P_1 and P_3 touching	P_2 external, space between P_1 and P_3	P_2 in tooth row between P_1 and P_3	P_2 absent; space between P_1 and P_3
Germany				1	1
Switzerland			1		
Lebanon				1	
Iran:	Maku	1			
	Chalus	1		1	
	Kermanshah			1	
	Shahpur Cave	1		1	
	Canae Gabru		1		
	Jask		1		
Afghanistan:					
	Boulan Cave	1			
	Jalalabad	8			

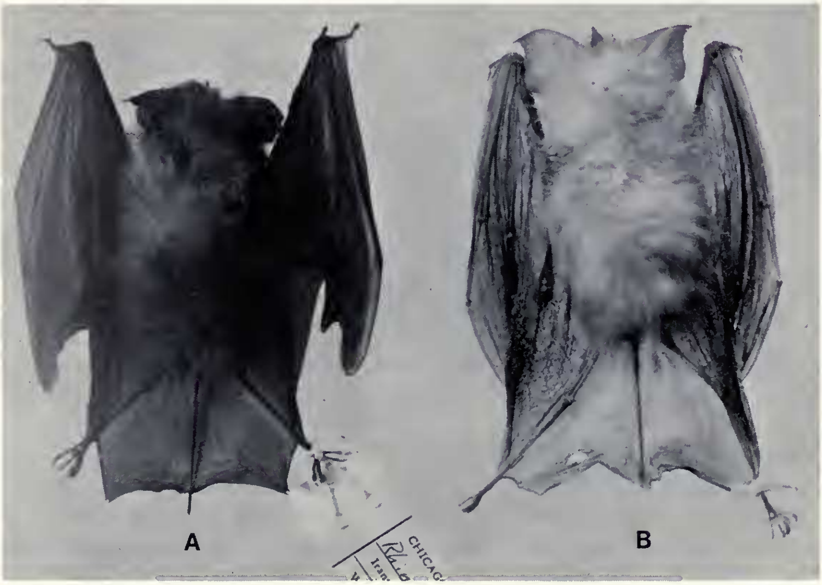

FIG. 59. Study skins of: **A,** the dark colored *Rhinolophus hipposideros* from the Caspian coastal area; and **B,** *R. h. midas*, which is found through most of the rest of Iran.

Switzerland (one), Germany (two), and Lebanon (one) that I have examined. The overall dorsal hair color of these bats is closest to Cinnamon-Brown of Ridgway (1912, Plate XV 15,k). The immature specimens from the Chalus series are more gray.

The dry specimens from Maku (one), Kermanshah (one), Shahpur Cave (three), and Canae Gabru (one) are essentially identical in color and match Avellaneous of Ridgway (1912, Plate XL 17, B) most closely. These specimens are also very similar to one from Boulon Cave and to six adults from Jalalabad, both in Afghanistan. The Jalalabad specimens are a slightly richer brown. The only dry immature specimens of this lighter form that I have seen are from Jalalabad and are distinctly grayer than the adults collected at the same time and place.

The Rezaiyeh, Jask, and 2 km. E Maku specimens are preserved in spirit and thus were not included in the above color comparison. However, they do appear lighter than spirit preserved specimens from the Caspian coast. From their geographic locations between records of light-colored specimens and in areas of low average precipitation (see below), these preserved specimens could reasonably be expected to match the lighter Iranian specimens more closely than the darker specimens from the Caspian coast. The fact that the Rezaiyeh and Jask specimens are in spirit would also explain why Andersen (1905) made no reference to the light color of *midas* in his original description and would explain why he referred the Rezaiyeh specimen to the darker form, *R. h. hipposideros*.

The dark Iranian specimens are all from the coastal plain of the Caspian Sea, an area that receives an average of 800 to 1800 mm. of precipitation annually (Ganji, 1968, p. 234). The other specimens are all from areas that receive an average of less than 600 mm. of precipitation per year (Ganji, 1968, p. 234). The color difference is not unexpected when Gloger's Rule is considered.

Etemad's (1967) two localities are split between the humid Caspian coastal plain (Sari) and the much more arid interior (Mahallat). These locations indicate that both color types are included, yet according to Etemad (1967), D. L. Harrison identified specimens from both localities as *R. h. minimus*. Harrison (1964, p. 85) in describing *R. h. minimus* from the Arabian Peninsula did say that the dorsal hair coloration is variable with "some individuals ... a warm fulvous brown, others duller, more greyish brown." But he did not mention any particularly light specimens. Since all nine of the dry adult Caspian coastal specimens that I have seen are essentially the same dark brownish color and since all seven of the dry Zagros Mountain specimens are essentially the same light brownish color, I feel that individual variation may be ruled out and the two groups must be recognized as distinct subspecies.

Of the two color types present in Iran, the darker Caspian coastal specimens are more similar to *R. h. minimus* from the Arabian Peninsula and *R. h. hipposideros* from northern Europe than to *R. h. midas*. *Rhinolophus h. hipposideros* and *R. h. minimus* have been differentiated on the basis of size; *Rhinolophus h. minimus* is smaller than *R. h. hipposideros* (e.g., Andersen, 1905, 1907; Miller, 1912). Intergrades have been recorded from Switzerland (Andersen, 1905). Andersen (1905) regarded as *R. h. minimus* those specimens with a forearm of 34.7 to 38 mm., and as *R. h. hipposideros* those with a forearm of 39 to 41.7 mm. (it was on this basis that he assigned the Rezaiyeh specimen to the nominate form). Miller (1912) used Andersen's forearm measurements, prefacing them with the word "usually," and added that *R. h. minimus* has a greatest length of skull ranging from 14.5 to 15.5 mm. and *R. h. hipposideros* has a greatest length of skull over 15.5 mm. Harrison (1964, p. 87) reported for *R. h. minimus* from Arabia a forearm range of 26.9 to 36.9 mm. and a greatest skull length range from 15.0 to 15.8 mm. This forearm measurement falls within the range given by Andersen (1905) and by Miller (1912), but the greatest length of skull range overlaps Miller's dividing line. The 16 Chalus specimens have a forearm range of 35.7 to 38.8 mm., and the forearm of the Babol specimen measures 38.4 mm.

The skulls of the 15 dry Chalus specimens (FMNH) and the skull of the Babol specimen (BM) have all been lost. The two alcohol specimens from Chalus and the one from an unknown location have not had the skulls removed. Therefore no skulls from this form in Iran were available to me. On the basis of forearm length and color these could tentatively be assigned to *R. h. minimus*. However, the lighter colored *R. h. midas* occurs on all sides of this isolated dark population, making the presence of *R. h. minimus* on the Caspian coast zoogeographically improbable. The dark *R. hipposideros* from the Caspian coastal plain must be examined in much more detail before their status can accurately be determined. It is possible they deserve recognition as a distinct subspecies. The lighter colored specimens from Iran are referable to the form *R. h. midas*.

Andersen (1905, p. 138) describes the sella of *midas* as "converging from base to tip; breadth at base (2.3 mm.) much more than half the vertical height of the sella (3.5)." The only two others who have mentioned sella shape in describing *R. h. midas* are Harrison (1964, p. 86), who repeated Andersen's measurements in discussing specimens from Baghdad, and Aellen (1959, p. 367), who gave the same proportions as Andersen without citing measurements in describing specimens from Boulon Cave, Afghanistan.

I have re-examined the holotype of *R. h. midas* and cannot determine any method of measurement that will produce dimensions even approximating those of Andersen (1905, p. 138). By my measurements taken with Helios dial calipers, the sella of this specimen is 1.5 mm. wide at the base, 1.2 mm. wide at the tip, and 2.0 mm. in height. While this reveals a sella with a base much more than half of the vertical height, the same is true of the specimens I have examined from Germany, Switzerland, Turkey, Lebanon, Jordan, and the Caspian coast of Iran. None of the 32 *R. hipposideros* on which I have taken sella measurements has a sella base less than 66.6 per cent of the sella height.

The degree of taper of the sella towards the tip was highly variable in the specimens I measured. The difference between width of base and width of tip in specimens from Switzerland, Germany, Turkey, Lebanon, Jordan, and the Caspian coast of Iran ranged from 0.2 mm. to 0.5 mm., whereas that of those from Baghdad, Iran south of the Elburz, and Afghanistan ranged from 0.1 to 1.0 mm. Interestingly, the specimens from Boulon Cave, Afghanistan, and from Baghdad, Iraq, had the most nearly deltoid sellas of any specimens examined and were considerably more deltoid than the holotype from Jask, Iran.

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are given in Table 9, I have examined two from Germany (FMNH 67540-1), one from Switzerland (FMNH 44123), five from four localities in Turkey (BM 4.9.15.1, 63.9.205, 97.6.1.1-2, 62.239), one from Lebanon (FMNH 99560), one from Jordan (BM 22.3.9.5), one from Egypt (FMNH 74476), two from Baghdad, Iraq (BM 18.7.4.1, 36.4.14.2), two from the Caucasus, USSR (BM uncataloged), 10 from Jalalabad, Afghanistan (FMNH 102409-15, 102424-6) and three from Boulon Cave, Afghanistan (FMNH 102429-31).

Ecological Notes:

The darker subspecies is known in Iran only from the moist, lushly vegetated strip of land between the Elburz Mountains and the Caspian Sea. Etemad (1969, p. 82) said the Sari specimen was collected from a colony found in an unused kiln, but the interior of the kiln was not dark. Lay (1967, p. 137) reported collecting this form from "almost totally darkened lofts or rooms of little-used barns and charcoal sheds" in the vicinity of Chalus. On 4 September 10 females and five males were collected, with one female added to the series on 6 September and another on 7 September. These bats were always active and could not be caught by hand. They "usually hung individually, though in close proximity to others" (Lay, 1967, p. 137). Both the immature specimen from Babol and the predominantly female series from Chalus are from buildings, indicating that man-made structures are utilized as nursery colonies. This subspecies has not yet been reported from a natural or man-made cave in Iran, but in the Arabian Peninsula the species is primarily a cavern-dwelling form (Harrison, 1964, p. 86), and *R. h. midas* in Iran has been taken from caves.

The reproductive cycle of the darker subspecies in Iran is not known. The Babol specimen had only poorly ossified epiphyses on 5 July, but the forearm length (38.4 mm.) is well within the adult range. Six of the 15 dry Chalus specimens collected in early September have a slightly grayer pelage characteristic of young of the year, but the epiphyses of these are almost completely ossified. The remaining 10 specimens are all adults with fully ossified epiphyses. Asdell (1964, p. 80) reported that in Europe *R. hipposideros* gives birth in June or July and that about 35 per cent of the females bear twins, the remaining bearing a single young. The above dates and the Chalus sex ratio conform to this pattern. Gaisler (pers. comm., 1976) said that Asdell's (1964, p. 80) figures are based upon embryo counts. Gaisler feels that the second embryo is usually resorbed and that birth of twins is quite rare in this species.

On 9 October the 1968 Street Expedition found five female *R. h. midas* in Shahpur Cave. The five were scattered through the cave but each hung in full torpor from the tip of a long slender stalactite. Four other species of bats were found in this cave on the same visit. Lay (1967) did not find this species when the 1962 Street Expedition visited this cave on 29 December. On 10 November 1968 I found one male and one female of this form hanging together (fig. 60) in a

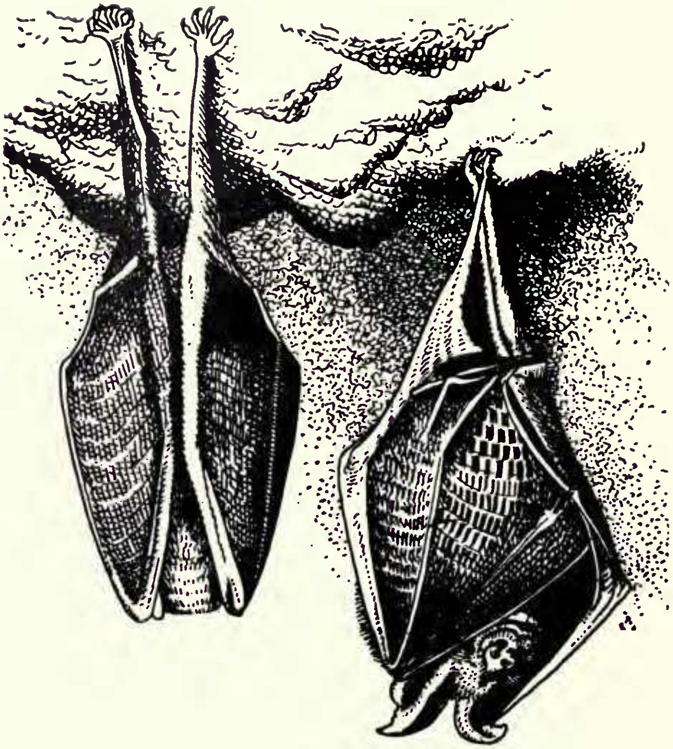

Fig. 60. *Rhinolophus hipposideros* hanging in a cave (Bobrinskii et al., 1965).

small crawlway deep in Canae Gabru Cave. At the time of our visit a strong, cold draft passed through this tunnel and the two bats were in deep torpor. Five other species were collected from this large complex cave, but all came from different areas.

The IPHR series collected in late August from 2 km. E Maku includes eight adult females, six immature males, and six immature females. Assuming this was a random sample of the colony, a litter size of two is indicated.

Specimens collected on 9 October and 10 November were in torpor, and on both occasions the specimens were found hanging in positions that provided maximum exposure to the cave environment. The absence of this species from Shahpur Cave on 29 December 1962 indicates that this cave, or at least such exposed and conspicuous areas of this cave, is not used as a hibernaculum.

Rhinolophus euryale Blasius

Rhinolophus euryale, Blasius, 1853, Arch. Naturgesch., **19**, 1, p. 49.

Type Locality.—Milan, Italy.

General Range:

Morocco, Tunisia, and Algeria (Hayman and Hill, 1971, p. 24). Southern Europe from Portugal east to Thrace and north to central France and the Carpathian Basin (van den Brink, 1968, p. 51). Transcaucasia and Turkmeniya (Bobrinskii et al., 1965, Map 18). Turkey, western Iran, Syria, Lebanon, and Israel (DeBlase, 1972, pp. 7-9).

Iranian Distribution:

DeBlase (1972, p. 8) has discussed the numerous misidentifications involving this bat in Iran. The valid records are listed in Table 11 and mapped on Figure 61. The records from Behbehan and Hamadan reported by Etemad (1967, p. 277) were only tentatively listed as *R. euryale* by DeBlase (1972, p. 8); however, measurements given by Etemad (1969, p. F90) for one specimen from each locality are well within the ranges for *R. euryale*. Farhang-Azad (1970) listed one *R. euryale* from 71 km. SE Meshabad and two from 8 km. NW Meher. I have examined all three of these specimens and agree with the identification of the first but have found the two from 8 km. NW Meher to be *R. blasii*.

Most of these Iranian localities are situated within the Zagros Mountains. The Mohammed Reza Shah National Park is located at the eastern end of the Elburz Mountains. This species may be expected to range throughout the Zagros and Elburz Mountains. The specimens from Mozduran and 71 km. SE Mashhad are the easternmost records in this species' entire range. These records suggest that *R. euryale* may occur through much of eastern Iran as well.

Subspecies:

Rhinolophus euryale euryale Blasius (see above)

Two forms referred to *R. euryale* have been described from southwestern Asia. *Euryalus judaicus* Anderson and Matschie, 1904, was described from the Cave at Adallam, Jerusalem, Palestine, and *Rhinolophus euryale nordmanni* Satunin, 1911, was described from

Table 11. Records of *Rhinolophus euryale* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Aberdeen Univ. (1965)	Shah Abbas Caves, Kuh Rang	CMB	1	1♂	1965	BM 66.3214	Cave
Lay (1967, p. 135)	Maku	WAZ	17	7♂ 10♀	27 Sept.; 2 and 6 Oct. 1962	FMNH 96540; 96542; 96544-9; 96551-3; 96555-9; 96561	Cave in the mountain south of Zangmar River at eastern edge of town.
Etemad (1967, p. 277)	Behbahan (=Behbehan)	KHU	1	1♂	—	—	
	Khorzaneh Cave, *nr.* Hamedan (=Hamadan)	HAM	1	1♀	Summer, 1965	—	Cave
Farhang-Azad (1970)	71 km. SE Meshad (=Mashhad)	KHR	1	1♂	30 July 1969	IPHR 1031	
DeBlase (1971, p. 87)	Canae Gabru cave *nr.* Tadovan	FAS	9	5♂ 4♀	10 Nov. 1968	FMNH 111170-3; 111175-7; 111179; 111181	In torpor hanging from dome in cave.
	Eshkaf Dareze Cave, W edge of Khurramabad	LOR	4	4?	6 Sept. 1968	FMNH 111601-4	3 immature mummies and 1 immature skull only, found in guano on floor of otherwise empty cave.
	30 km. NE Bijar	KOR	2	1♂ 1♀	20 Sept. 1969	UMM 117562-3	Young of year, collected in a "religious shrine."
Felten (in press)	Mozduran	KHR	7	6♂ 1♀	4 Oct. 1974	—	Cave? SMF 46680-7 (Felten, pers comm., 1975)
New Records	Mohammed Reza Shah National Park	MAZ	1	1♀	14 Aug. 1970	—	Mistnetted in scrub forest. BM 71.1637.

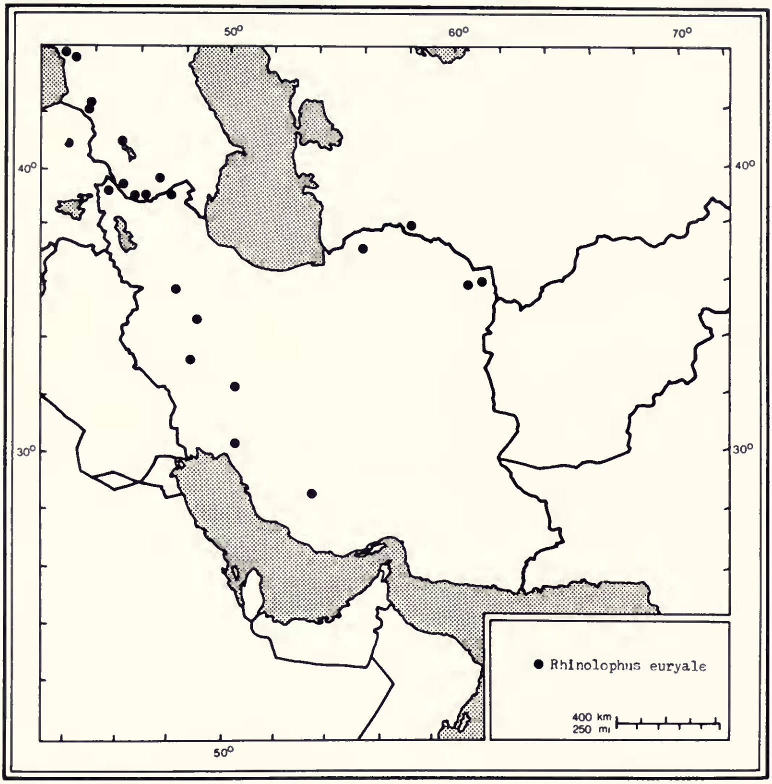

FIG. 61. Distribution of *Rhinolophus euryale.*

Pavlovsk, Sukhum District, Transcaucasia. Both of these were regarded as full subspecies of *R. euryale* by Ellerman and Morrison-Scott (1951, p. 120). Harrison (1964, p. 85) retained the name *R. e. judaicus* for specimens from the Arabian Peninsula but stated that he considered "*judaicus* to be hardly distinguishable from *R. e. euryale*" (Harrison, 1964, p. 90). Ognev (1928, p. 313) pointed out several discrepancies in Satunin's original description of *R. e. nordmanni* and also found little to distinguish this form from *R. e. euryale*. He listed it as "*Rhinolophus e. euryale* morpha. *nordmanni*." Bobrinskii et al. (1965, p. 87) seemed to agree with Ognev. I have not had material of the nominate form or of *R.e. nordmanni* available for comparison, but I agree with Harrison (1964) that all of this material must be more closely examined before the relationships can be clarified. Until this is done I must agree with the Soviet authors and refer the Iranian specimens to the nominate subspecies.

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are listed in Table 11, I have examined two from Greece (FMNH 44155-6), 16 from Lebanon (FMNH 99556-67, BM 61.415-8), and seven from Turkey (FMNH 105626-7, BM 11.1.1.128, BM 66.169-70, and two BM uncataloged).

Ecological Notes:

On 27 September and again on 2 and 6 October 1962, Lay visited a cave in the mountain south of the Zangmar River at the eastern edge of Maku where he observed "*Rhinolophus euryale* and *Miniopterus schreibersi*, the former greatly outnumbering the latter" (Lay, 1967, p. 89) hanging on the walls. Four of the 21 *Rhinolophus* Lay collected in this cave are *R. mehelyi* and the remaining seven males and 10 females are *R. euryale*. On 25 July 1968 I revisited this cave and located the room described by Lay. The chamber was quite wet and a few inches of guano carpeted the floor but no bats were present. A single *Myotis blythi* was observed in a small hole in the large entrance room and mistnetting of the entrance at and after sundown yielded one *M. blythi* and one *Pipistrellus savii*. No *Rhinolophus* were found. This cave appears to be used as a hibernaculum or a migratory roost used prior to hibernation, but it is not inhabited by *Rhinolophus* of either sex during the summer.

Lay (1967, p. 90) also mentioned a cave 43 km. SE Maku that contained "Great numbers of *Miniopterus schreibersi* and at least one *Rhinolophus euryale*" on 1 October 1962. He did not mention a specimen record of *R. euryale* from this location nor is such a specimen to be found in the collections of Field Museum. Lay did not explain how this bat was identified as *R. euryale* if it was not collected.

Five male and four female *R. euryale* were found on 10 November 1968 in deep torpor hanging from a small dome in Canae Gabru Cave along with five *R. blasii* and a single *Myotis capaccinii*. Other portions of this extensive and complex cave contained *R. hipposideros* and two species of *Rhinopoma* but guano deposits were observed only near the entrance in the areas inhabited by the

Rhinopoma. Thus it appears that this cave is also a hibernaculum and is not occupied by *Rhinolophus* during the summer months.

On 6 September 1968 I found four mummified *R. euryale* in a cave in the mountain at the west edge of Khurramabad. A great quantity of guano was present and the *Rhinolophus* mummies as well as those of three *Myotis blythi* were found in the guano. One live bat (identified as *R. ferrumequinum* because of size and flight character) was observed, but escaped capture. The *R. euryale* mummies are all of immature individuals incapable of flight. This cave did not penetrate very deeply into the mountain and, except for one small room that contained no guano, light from the entrance was visible from all parts of the cave. The presence of mummified prevolant *R. euryale* and large guano deposits indicate that this cave is used by *R. euryale* as a nursery site. *Myotis blythi* and *R. ferrumequinum* were collected from another cave 2 miles north in the same mountain but no living *R. euryale* were seen in this area.

In summary, three caves probably used as hibernacula by *R. euryale* contained this species on 27 September 1962, 4 October 1974, and 10 November 1968. One of these caves did not house the species on 25 July. A cave apparently used as a nursery site contained no *R. euryale* on 6 September. At the northernmost site (39° 17'N) for this species in Iran, the bats had arrived at the hibernaculum by 27 September but had not yet become torpid (Lay, 1967, p. 89). At the southernmost locality yet recorded (at about 29° 8'N) *R. euryale* was in deep torpor on 10 November.

Lay (1967, pp. 89-90) observed *R. euryale* in mixed clusters with *R. mehelyi* and *Miniopterus schreibersi* at Maku. At Canae Gabru Cave the *Rhinolophus* hung singly and in small clusters of two or three. It was not discovered at the time of collection that both *R. euryale* and *R. blasii* were present so it is impossible to say if any of the clusters contained both species.

Rhinolophus mehelyi Matschie

Rhinolophus mehelyi Matschie, 1901, S. B. Ges. Naturf. Fr. Berlin, p. 225.

Type Locality.—Bucharest, Rumania.

General Range:

Morocco, Tunisia, and Libya (Hayman and Hill, 1971, p. 24). Scattered locations in southern Europe from Portugal to Rumania (van den Brink, 1968, p. 53). Transcaucasia (Bobrinskii et al., 1965, Map

18). Turkey, Iran, Cyprus, Israel, Jordan, and Egypt (DeBlase, 1972, pp. 7-10).

Iranian Distribution:

DeBlase (1972, pp. 8-9) has reidentified as *R. mehelyi* several specimens originally reported by Etemad (1963), Aberdeen University (1965), and Lay (1967) as *R. euryale* and has reported an additional locality. *Rhinolophus mehelyi* is thus known from four localities in Iran: three collected at Shah Abbas Caves, Kuh Rang, Chahar Mahal and Bakhtiari Province (BM 66.3211-3) in 1965 (no more precise date given); four specimens collected on 27 September and 2 October 1962 from a cave just east of Maku, West Azarbaijan Province (FMNH 96541, 96543, 96550, 96554); 14 specimens collected on 29 December 1962 from Shahpur Cave, Fars Province (FMNH 96614-9, 96621-7, 101989), and 40 specimens from Gara Tarik, about 4 km. N Qareh, Kordistan Province (FMNH 111129-68).

These localities range down the Zagros Mountains from Maku, near the Soviet border, south to Shahpur Cave (fig. 62). This species probably occurs throughout the Zagros Mountains and may occur in the Elburz Mountains as well.

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are given above, I have examined eight from Egypt (BM 92.9.9.5-6, 5.8.8.2, FMNH 79066, 79075, 79081-2, 79089), one from Palestine (FMNH 34175), two from Israel (BM 94.12.1.14-5), one from Jordan (BM 22.3.9.3), and one from Turkey (BM 62.238).

Ecological Notes:

The two male and one female *R. mehelyi* collected at Kuh Rang were reported from a cave (Aberdeen University, 1965) but no further ecological data are available.

The Maku specimens were collected on 27 September and 2 October 1962 from a wet chamber in a small cave just east of the town. This chamber housed about 200 *Rhinolophus* and a much smaller number of *M. schreibersi* (Lay, 1967, p. 89). A sample of 20 *Rhinolophus* from this cave included 16 *R. euryale* and four *R. mehelyi* (three females, one male). The bats were active on both visits. I visited this cave on 25 July 1968 and found no *Rhinolophus* or *Miniopterus*. One *M. blythi* was observed in the cave, and one *M.*

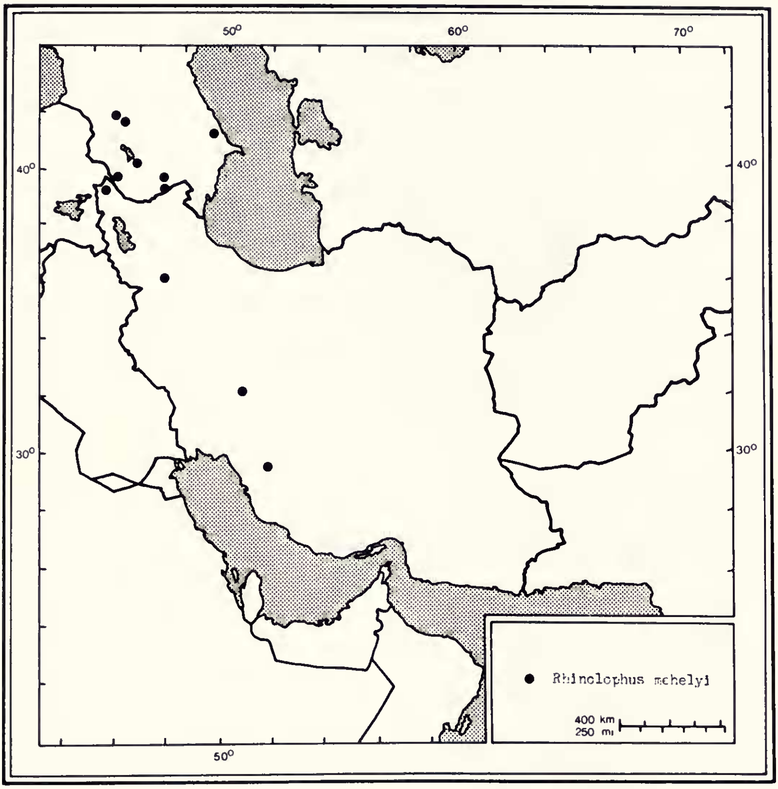

FIG. 62. Distribution of *Rhinolophus mehelyi.*

blythi and one *Pipistrellus savii* were mistnetted at dusk at the cave entrance on 28 July. The presence of *R. mehelyi* in this cave on 27 September and 2 October and their absence on 25 and 28 July indicates that the cave is used as a hibernaculum or as a roosting area just prior to hibernation but does not serve as a nursery site.

The Shahpur Cave specimens were collected on 29 December 1962 from a group of 300 to 400 bats that were "fat but active" (Lay, 1967, p. 135). The sample included four females and eight males. On this date three other species were found in the cave. On 9 October the 1968 Street Expedition visited this cave and collected five species of bats, but *R. mehelyi* was not found on this visit.

On 13 August 1968 a collection of 1497 bats was brought to the Street Expedition camp near Divandarreh, Kordistan Province.

This sample included 129 *R. mehelyi*, 73 females, 55 males, and one of undetermined sex. On 14 August several members of the Expedition visited the cave from which this sample had been taken. Known locally as Gara Tarik (=Dark Cave), it is located about 4 km. N the village of Qareh. In the large chambers of this cave we found an estimated total population of 30,000 bats in a ratio of two *R. mehelyi* to two *M. blythi* to one *M. schreibersi*. Much of the ceiling of the dark area of the cave was covered with large clusters of bats that included all three species apparently randomly mixed. As we approached these massive clusters, the *Rhinolophus* flew out and retreated to higher cracks and domes. The two vespertilionid bats seemed to be in torpor and were easily collected by hand. This difference in activity would account for the low percentage of *R. mehelyi* in the sample brought to our camp (8 per cent) as compared to their estimated percentage in the total population (40 per cent).

Twenty-four specimens of *R. mehelyi* were saved from the sample brought to our camp and an additional 16 were collected at random upon our visit to the cave. The 40 bats preserved included 14 adult females, two adult males, 12 immature females, and 12 immature males. Asdell (1964) listed no reproductive data for *R. mehelyi*, and I have found none elsewhere in the literature. The low percentage of adult males (5 per cent) in the sample of *R. mehelyi* from Gara Tarik indicates that this cave is a nursery inhabited primarily by females and young of the year. The ratio of adult females to immatures suggests a litter size of two for this species.

Rhinolophus blasii Peters

Rhinolophus blasii Peters, 1857, Monatsb. Akad. Wiss. Berlin, **17.** New name for *clivosus* Blasius, 1857 *nec.* Cretzschmar.

Type Locality.—Italy

General Range:

Transvaal, Rhodesia, Zambia, Malawi, Zaire, Ethiopia, Eritrea, and Morocco (Hayman and Hill, 1971, p. 24). Italy, Sicily, and the Balkan Peninsula south to Greece and Crete (van den Brink, 1968, p. 51). Israel, Jordan, Syria, and Yemen (Harrison, 1964, p. 90). Cyprus (Bate, 1903). Turkey (Çağlar, 1965, p. 127). Transcaucasian USSR and Transcaspia (Iran?) (Bobrinskii et al., 1965, Map 17). Afghanistan (Gaisler, 1971, p. 99). Pakistan (Roberts, 1977, p. 55).

Iranian Distribution:

All specimen records of *R. blasii* from Iran are listed in Table 12. In addition Bobrinskii (1965, Map 17) mapped two localities that appear to be near the Soviet border in northern Khorasan Province. A skin in the British Museum is labeled "Mekran Coast." This may have been collected in either Iran or Pakistan.

This bat has been collected from the north, central, and southern Zagros Mountains, from mountains of northeastern Iran and from Yazd, Kerman, Tadovan, and the Mekran Coast in the southeast (fig. 63). These widely distributed localities together with the numerous records in Afghanistan indicate that this species may be expected in all of the dry, mountainous portions of this country.

Subspecies:

Rhinolophus blasii blasii Peters (see above)

Only the nominate form is known from the Palearctic. Other subspecies are presently recognized from the Ethiopian Region (Hayman and Hill, 1971, p. 24).

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are listed on Table 12, I have examined 89 specimens from six different localities in Afghanistan (FMNH 102271-82, 102289-322, 102323-52, 102355-63, 102382-5); four from Cyprus (FMNH 78101-3, 78105); one from Palestine (FMNH 34176); one from Turkey (BM 66.168); and six from Yemen (FMNH 77832, 77840, 77876, 77899, 77907, 77915).

Ecological Notes:

Etemad (1964), Aberdeen University (1965), Lay (1967), and Felten (in press) have reported *R. blasii* from caves in Iran. Ognev (1928), Sanborn and Hoogstraal (1955), Aellen (1959), Lindberg (1962), Harrison (1964), Çağlar (1965), Meyer-Oehme (1965), and Neuhauser (1969) reported the species from caves in Afghanistan, the USSR, Turkey, and the Arabian Peninsula. Lay (1967) and Neuhauser (1969) also reported its occurrence in qanats in Iran and Afghanistan respectively. None of these authors nor any others I have seen reported the occurrence of *R. blasii* in Asia in other than a natural or man-made cave, though several authors do not describe habitat.

TABLE 12. Records of *Rhinolophus blasii* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Etemad (1964, p. 653)	Baba-djabar Cave *nr.* Mahallat	CEN	2	2♂	Nov. (?) 1963	—	Cave
Aberdeen Univ. (1965)	Shah Abbas Caves, Kuh Rang	CMB	3	3♀	1965	BM 66.308-10	Cave
Lay (1967, p. 136)	Robat-i-Qarabil	KHR	12	3♂ 9♀	9 Nov. 1962	FMNH 96563-74	Cave
	Shahrabad Kaur	KHR	27	13♂ 14♀	9 Nov. 1962	FMNH 96575-601	Qanat
	Ganjah Kuh Cave	KHR	12	5♂ 7♀	12 Nov. 1962	FMNH 96602-6; 98371-7	Qanat
	1.6 km. E Kerman	KRM	6	3♂ 3♀	8 Dec. 1962	FMNH 96608-13	Cave
Farhang-Azad (1970)	Chelmir	KHR	2	2♀	13 July 1969	IPHR 540, 544	
	8 km. NW Meher, 48 km. W Sabzavar (=Sabzevar)	KHR	2	1♂ 1♀	5 Aug. 1969	IPHR 1123-4	

TABLE 12. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Farhang-Azad (1971)	137 km. SE Sabzavar (=Sabzevar)	KHR	7	7♀	10 Sept. 1970	IPHR 3705-11	
	15 km. S, 6 km. E Yazd	YAZ	4	4♀	14 Dec. 1970	IPHR 4560-63	
Felten (in press)	Mozduran	KHR	1	1♀	4 Oct. 1974	—	Cave? SMF 46686 (Felten, pers. comm., 1975).
	Tabriz	EAZ	1	1♀ ?	March 1975	—	SMF 47842 (Felten, pers. comm., 1975).
New Records	Maku	WAZ	1	1?	26 July 1968	FMNH 111605	Found decomposed, floating in water in man-made tunnel in cliff.
	Canae Gabru Cave, near Tadovan	FAS	5	5♂	10 Nov. 1968	FMNH 111169; 111174; 111178; 111180; 111182	Cave
	Afghan Cave 110 km. SE Tehran	CEN	2	1♂ 1♀	23 April 1969	IPHR uncat.	Female with enlarged teats and pregnant.
	3 km. SW Isfehden (=Esfideh)	KHR	1	1♀	6 Nov. 1962	USNM 327989	
	5 km. NE Isfehden (=Esfideh)	KHR	1	1♂	8 Nov. 1962	USNM 327990	

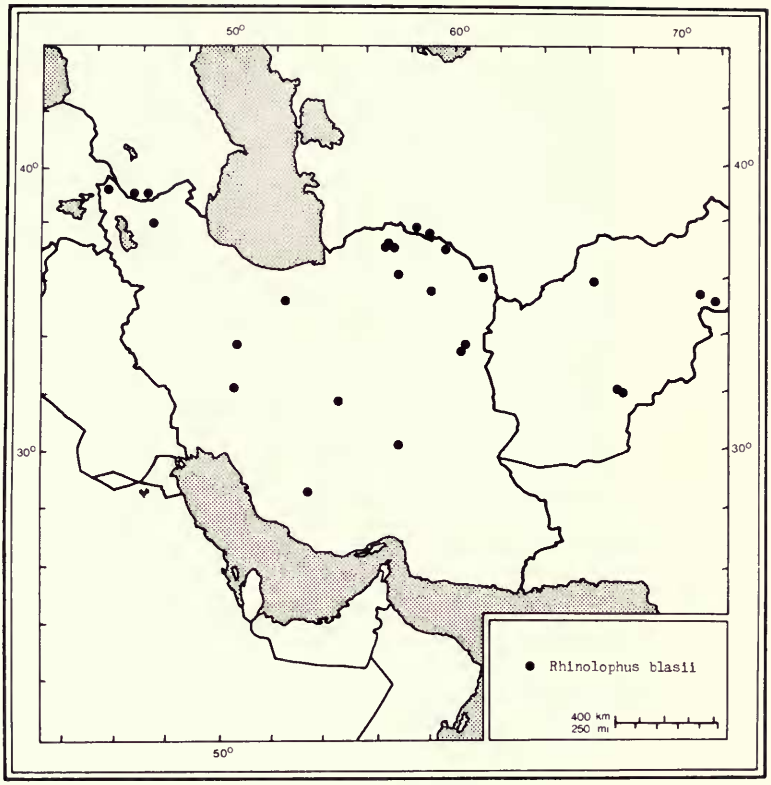

FIG. 63. Distribution of *Rhinolophus blasii.*

The 1968 Street Expedition collected this species from a man-made tunnel cut into a cliff at Maku and from a large cave known as Canae Gabru near the village of Tadovan about 64.5 km. N Jahrom. The Canae Gabru specimens were found in deep torpor hanging from the dome of a small room. The temperature of the room was 75° F and relative humidity was 91 per cent. Five *R. blasii* shared the room with nine *R. euryale* and one *Myotis capaccinii*. The *Rhinolophus* hung singly and in small clumps of two to three. Since it was not discovered that two species were present until much later, the relationships of roosting sites of these two species is not known. In other portions of the cave we found *R. hipposideros* and two species of *Rhinopoma*.

The individuals collected in November and December by Lay and the 1968 Street Expedition were all first observed in torpor and apparently had begun hibernation. The 26 July specimen (Maku) was found dead and partly decomposed. The tunnel in which it was found was explored but neither additional specimens nor any further evidence of bat occupation was found.

Little is known of the annual and reproductive cycles of this species in Iran. The same is true for the Arabian Peninsula (Harrison, 1964, p. 92) and apparently for Europe as well (van den Brink, 1968, p. 50). Asdell (1964) does not report any reproductive data for this bat.

In northern Iran hibernation appears to have begun by 9 November (Lay, 1967). In Afghanistan the species was still flying out of the caves after dark on 30 October (Neuhauser, 1969). But the climatic differences between Shahrabad Kaur, Khorasan Province, Iran, and Shamshir Gaur, Kandahar Province, Afghanistan, most likely explains this difference in activity.

Asellia tridens (Geoffroy Saint-Hilaire)

Rhinolophus tridens Geoffroy Saint-Hilaire, 1813, Ann. Mus. Hist. Nat. Paris, **20**, p. 26, Pl. 5.

Type Locality.—Egypt. Restricted to Thebes by Kock (1969, p. 215).

General Range:

Gambia, Senegal, Morocco, Algeria, Tunisia, Libya, Egypt, Sudan, Ethiopia, Somalia, Chad, Eritrea, Socotra, and ?Zanzibar (Hayman and Hill, 1971, p. 29). Throughout the Arabian Peninsula from Mosul, Iraq, to the southern coasts of Aden and Oman (Harrison, 1964, p. 97; Nader, 1975, p. 338). Baluchistan and Sind, Pakistan (Siddiqi, 1969, p. 8; Roberts, 1977, p. 60). Southern Afghanistan (Neuhauser, 1969).

Iranian Distribution:

Records of *Asellia tridens* from Iran are listed on Table 13 and mapped on Figure 64. The records in Iran and adjacent countries indicate that this species occurs throughout the Khuzistan Plain, the Persian Gulf, and Mekran coastal strips, and the mountain and desert areas of southern Iran. Kock (1969, p. 129) mapped this species much further north in Iran than it has been reported and probably much further than it can be expected to go, though its range in the central deserts is unknown.

TABLE 13. Records of *Asellia tridens* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Andersen (1881, p. 113)	Sulzabad, Bushire (=Bushehr)	FAS	1	1♂	—	BM 79.8.15.1	
Etemad (1967, p. 277)	Chagazniel, Dezful	KHU	1	1♀	Spring, 1964	—	Extremely large groups found in old buildings.
	Kazerun	FAS	1	1 ?	—	—	
	Roudan (=Rudan), 80 km. E Bandar Abbas	COS	1	1♀	Fall, 1966	—	Flew at sunset very close to ground; several hundred found in well.
Lay (1967, p. 139)	Rabatak	FAS	9	8♀	4 Jan. 1963	FMNH 94378-85	50 to 100 mummies found "in a pile on the floor of an abandoned house."
	Jahrom	FAS	7	3♀ 4 ?	31 Dec. 1962	FMNH 98386-92	Mummies found in "seldom used or abandoned buildings."
	Shush	KHU	1	—	—	—	Collection of R. E. Mumford, Purdue Univ.
	Kerman	KRM	3	—	—	—	NMV 8894-5, 8895-5, 8896-5, skulls only.
	Seistan	SAB	1	1?	—	BM 6.1.2.1	Could be from Afghanistan.
	Mekran Coast	SAB?	1	1♂	August, 1877	BM 85.8.1.368	Could be from Pakistan (Siddiqi, 1969).

Table 13. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Farhang-Azad (1971)	3 km. to Shushtar	KHU	38	—	9 to 13 Sept. 1970	—	
New Records	Mehran	ILA	1	1♂	5 Sept. 1968	FMNH 111233	Mummified, found in house; immature.
	Sarin Ab-Garma Cave, Dehloran	ILA	7	5♂ 2♀	5 Sept. 1968	FMNH 111226-32	Large cave with approximately 5,000 *A. tridens*.
	Chah Bahar	SAB	2	2♂	1966-67	IPHR uncat.	
	Kazerun	FAS	1	1♂	1968	IPHR uncat.	A prevolant immature.
	10 km. SE Kazerun	FAS	1	1♀	19 Nov. 1963	USNM 350142	
	Sarin Ab-Garma Cave, Dehloran	ILA	10	3♂ 7♀	20 June 1973	—	(Lay, pers. comm., 1974) Females adult, males immature.

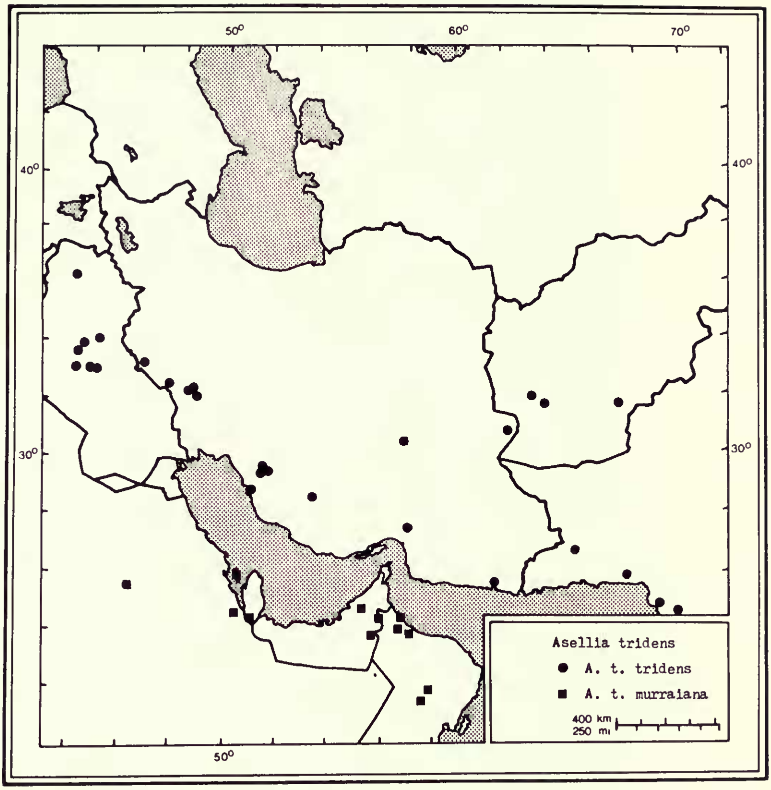

FIG. 64. Distribution of *Asellia tridens.*

Subspecies:

Asellia tridens murraiana (Anderson)

Phyllorhina tridens var. *murraiana* Anderson, 1881, Catalogue of Mammalia in the Indian Museum, p. 113.

Type Locality.—Karachi, Sind, West India (=Pakistan).

Range.—This form ranges from Morocco across the northern Saharah to Sinai, the Levant, and Iraq. An isolated (?) population occurs in Aden (Kock, 1969, p. 129). The form extends across southern Iran to Afghanistan and Pakistan (Anderson, 1881; Aellen, 1959).

Karachi, Sind, western India, is the stated type locality for *Asellia tridens murraiana* Anderson, 1881, but the Bushehr specimen was one of the series included in this form at the time of its description. Aellen (1959) has reported *A. t. murraiana* from Afghanistan, and Harrison (1964, p. 97) has reported it from Iraq and Aden. The nominate form, *A. t. tridens*, was described from Egypt and has been recorded from Oman and southeastern Saudi Arabia (Harrison, 1964, p. 97). Kock (1969, p. 129), in his study of the relationships between these two forms, mapped all of the Iranian records as "*unterartliche zugehörigkeit noch ungeklärt*."

Asellia t. murraiana was described by Harrison (1964, p. 97) as being, on the average, larger in size than *A. t. tridens*. Kock (1969) agreed in using average lengths of forearm and various cranial dimensions to separate the two forms.

I have examined specimens collected by the two Street Expeditions from Mehran, Dehloran, Rabatak, and Jahrom, and specimens in the British Museum from Bushehr, Seistan, and the Mekran Coast. Measurements of all of these specimens (Appendix I) fit the ranges and means given by Kock (1969) and Harrison (1964) for *A. t. murraiana* better than those for *A. t. tridens*.

Harrison (1964, p. 97), in describing the color of *A. t. murraiana*, said that, "Erythristic individuals seem to be very unusual in this form and possibly even do not occur." The 24 specimens from Afghanistan and the Iranian specimens from Dehloran, Mehran, Jahrom, and Chah Bahar that I have examined are mostly a light, yellowish brown; a few are more grayish. Of the series of eight mummified *A. t. murraiana* from Rabatak, five match the other Iranian specimens, but three are considerably redder both dorsally and ventrally. Specimens FMNH 98379 and 98384 have an overall dorsal coloration matching OOS 13-19° of Villalobos-Dominguez and Villalobos (1947) and have a very similar ventral coloration. Specimen FMNH 98385 is even redder and has a ventral coloration closest to OSS 14-10°. The dorsal color is similar, but this mummy is in too poor a condition for accurate comparisons of the dorsum to be made. Forearms of these three specimens measure 50.4, 51.4 and 51.4 mm., respectively. Etemad (1969, p. 97) described the Rudan specimens as all being pale grey but said the Dezful specimens were variable in color with some orange and some reddish orange (henna).

Specimens Examined:

In addition to the specimens for which catalog numbers are listed on Table 13, I have examined 48 specimens from three localities in Afghanistan (FMNH 102432-79) and four from Pakistan (BM 19.11.7.7-10).

Ecological Notes:

Little or no ecological data is reported for the specimens from Bushehr, Kazerun, Shush, Kerman, Seistan, Mekran Coast, or Chah Bahar. Of the remaining locations only mummies are known from Rabatak, Jahrom, and Mehran.

Lay (1967, p. 61) obtained the Rabatak specimens from a group of 50 to 100 mummified individuals that "lay in a pile on the floor of an abandoned house" on 4 January 1963. The eight specimens I have seen are all adult females. Presumably some disaster wiped out a nursery colony before parturition had begun. No embryos were found to support this hypothesis but the specimens are not in good condition. Al-Robaae (1966, p. 211) said that the sexes do separate during the summer in Iraq, and Gaisler et al. (1972, p. 22) reported the same conditions in Egypt. The series from Jahrom included three adult female mummies and four skulls only. All are dated 31 December 1962. These specimens apparently were found in "seldom used or abandoned buildings" in that city (Lay, 1967, p. 139). According to Lay (1967, p. 139) people in Jahrom said that these bats were a nuisance in many houses, but he found no live bats in late December and concluded that they either migrate or hibernate. Similar conclusions were drawn by Harrison (1964, p. 102) for a population in the Ramadi-Habbaniya caves in Iraq. We examined several buildings said to contain bats in Jahrom during the second week of November, 1968. Most of these contained abundant guano, but only one building was found to house bats; these were *Pipistrellus kuhli*. Al-Robaae (1966, pp. 210-11) found that *A. tridens* in Iraq summer in caves, old houses, and ruins; from mid-September until mid-November they wander to hibernacula in cellars and tombs; and in early April they return to summer quarters. The Iran observations are consistent with this pattern.

The Mehran specimen is a single mummified male brought to us by a boy as we passed through that town on 5 September 1968. We were told that the mummy had been found in the boy's house and that there were many bats there but they were now all gone. Whether this meant that they had migrated or been exterminated or driven out I could not ascertain. Later in the expedition (16 to 20

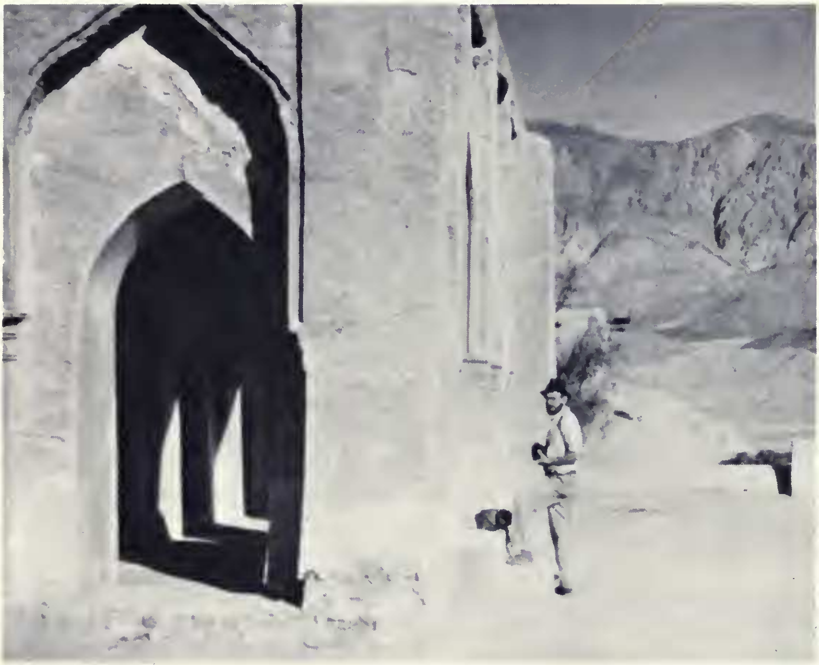

FIG. 65. Mosque in Hormud-e Bagh that had recently been fumigated with DDT.

November), we were taken to several buildings that were said to contain bats in the towns of Hormud-e Bagh and Bastak in central Fars Province. On each of these occasions we found only many dead insects and the distinctive odor of DDT, but no bats. A notice painted next to the door on each of these buildings (fig. 65) announced that a pest control team had visited and applied DDT. The notices were each dated about a month prior to our visit.

Asellia tridens is known to occur in large numbers at three localities. Etemad (1969, p. 97) found them in extremely large groups in old buildings at Chagazniel in Dezful, and found several hundred in a well at Rudan. On 5 September 1968 I visited a large cave known as Sarin Ab-Garma just north of the town of Dehloran. We arrived at this cave just after the beginning of twilight and large numbers of bats were flying. A sample of 23 bats, collected with a hand net at a constriction in the passageway, included 14 *Miniopterus schreibersi*, seven *A. tridens*, and two *Rhinopoma microphyllum*. While this sample was being taken, I examined the deeper regions of the cave and observed about 5,000 *A. tridens*, 100 *R. microphyllum*, and 1 *M. schreibersi* hanging on the walls. Presumably *Miniopterus* exits from the cave before *Asellia*, and thus they dominated the sample of flying bats but were essentially absent from those observed at rest.

The main passage of this cave was estimated at over 100 ft. in height. The walls converged gradually and met at the apex, so that no true ceiling was present. Starting about 2.5 m. up, the walls were covered with spots of crystallized urine and feces. Each spot measured about 15 cm. in diameter and was spaced about 15 cm. from the spots surrounding it. A single *Asellia* hung on each spot. The temperature 2 m. from the floor was 85°F and the relative humidity was 80 per cent. All of the members of our collecting party were having difficulty breathing and there seemed to be a definite lack of oxygen, at least in the lower 2 m. of passageway. The seven *Asellia* collected include two females and five males. All appear to be adults by epiphysial ossification. On 20 June 1973 Lay visited this cave and collected 10 *A. tridens*. This sample includes seven females and three immature males, one of which was found clinging to its mother. On this visit most of the crystallized urine spots were occupied by a species of *Rhinopoma* rather than by *Asellia* (Lay, 1973, pers. comm.).

Triaenops persicus Dobson

Triaenops persicus Dobson, 1871, Jour. Asiatic Soc. Bengal, **40.2,** p. 455, pl. 18.

Type Locality.—Shiraz, about 4,750 ft., Persia.

Cotypes.—Adult female in spirit, Indian Museum Calcutta (Dobson, 1878, p. 125). BM 76.3.10.3, Sex ?. Skull and viscera removed from specimen in spirit. The carcass has a paper tag with the following information:"No Reg. Nº," "Shiraz," "Paratype of *persicus*," and a metal tag with the numbers "302" stamped into one side and "1066" scratched into the other. No skull labeled as BM 76.3.10.3 was found. A skull of this species labeled "No Reg.," "Shiraz," "278" was located.

General Range:

Oman and Aden (Harrison, 1964, p. 105). Somalia, Ethiopia, Kenya, Tanzania, ?Zanzibar, Uganda, Mozambique, and Congo (Brazzaville) (Hayman and Hill, 1971, p. 30).

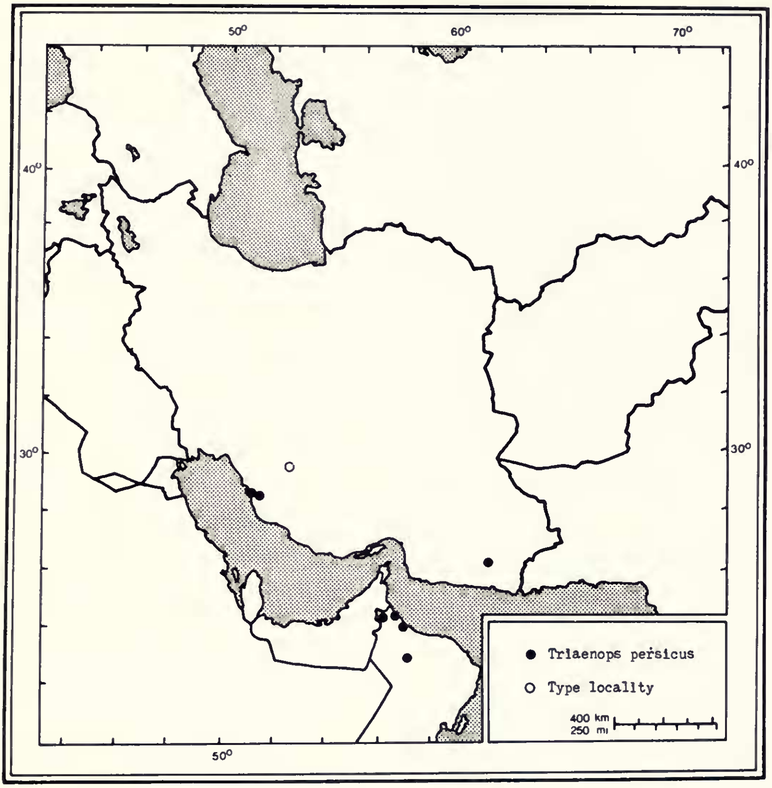

FIG. 66. Distribution of *Triaenops persicus*.

Iranian Distribution:

Dobson (1871, p. 459) described the species from Shiraz, Fars Province. Harrison (1955, p. 900) mentioned a specimen in the British Museum from Bushire (=Bushehr), Bushehr Province, and Lay (1967, p. 139) reported 16 specimens from Ahram, Bushehr Province. There are seven from Nik Shahr (=Nikshahr) Sistan and Baluchistan Province in the National Museum of Natural History.

This species is known in Iran only from the above four localities (fig. 66). However, it has been only very rarely collected throughout its range, and it may be more widely distributed in southern Iran and may even enter Pakistan.

Subspecies:

Triaenops persicus persicus Dobson (see above)

Only the nominate form occurs in Iran. Harrison (1955, p. 900) described the form *T. p. macdonaldi* from Oman as being much darker in color than is indicated in the type description of the nominate form and darker than the Shiraz cotype and Bushehr specimens preserved in alcohol at the British Museum. The holotype of *T. p. macdonaldi* was described as "pale grey-brown somewhere between the drab of Ridgway (plate 3, No. 18) and drab-grey (plate 2, No. 13). The belly is a pale buff colour somewhere between olive-buff of Ridgway (plate 5, No. 12) and cream colour (plate 6, No. 20)." One of the eight specimens in the Oman series differs from the others in color. It was designated as a cotype and was described as "light brown, close to clay colour of Ridgway. . . . The face, throat and crown of the head are darker matching ochraceous buff of Ridgway (plate 5, No. 10), while the belly is uniformly paler, a little more orange than cream-buff of Ridgway (plate 5, No. 11)."

I have examined the 10 specimens collected at Ahram by the 1962 Street Expedition and preserved as dry skins in Field Museum. This series exhibits considerable color variation. The 10 specimens may be divided into five groups on the basis of color. Colors stated below are from Villalobos-Dominguez and Villalobos (1947); the colors that are designated by these authors as matching the colors of Ridgway are also given here where pertinent.

Specimens FMNH 96674 and FMNH 96675 (males) are the palest individuals in the series and match the type description of *T. persicus* as stated by Dobson (1871) and quoted by Harrison (1955). The dorsal pelage is 0-14-4°, slightly lighter than Clay Color (0-13-7°). The ventral pelage is OY-18-6°, slightly lighter than Cream Color (OY-18-8°). As with Dobson's type, these specimens are slightly darker in the shoulder and head regions, but they do not have the yellowish tinge toward the root of the tail which he mentioned.

Specimens FMNH 96669 (female), 96671, 96676, and 96680 (males) are intermediate between the two described above and those described below. The dorsal pelage is closest to 0-13-10°, close to Clay Color (0-13-7°). The ventral color is OOY-15-7°, slightly redder than Cream Buff (OOY-17-6°).

Specimens FMNH 96673 and 96679 (males) are essentially the same as the four immediately above in ventral color but the dorsal color is darker. It is closest to 0-10-6°, slightly darker than Clay Color (0-13-7°).

Specimen FMNH 96672 (female) is the darkest brown and resembles the holotype of *T. p. macdonaldi* most closely. The dorsal pelage is OOS-9-4°, very close to Drab Gray (OOS-10-3°). The ventral color is completely uniform but does approach Olive Buff (OOY-16-3°) and is closest to OOY-17-5°. The head and throat regions are darker and brighter, close to Clay Color (0-13-7°) and closest to 0-16-7°.

Specimen FMNH 96678 (female) is the reddest individual in the series. The dorsal pelage matches 0-11-9°, very close to Clay Color (0-13-7°). The pelage on the head is similar to that on the back and is not nearly as bright as the Ochraceous Buff (0-16-9°) on the head of the *T. p. macdonaldi* cotype. The ventral pelage, 0-13-9°, is slightly brighter than the dorsal pelage and is considerably redder than the Cream Buff (OOY-17-6°) venter of the *T. p. macdonaldi* cotype.

Harrison (1955, p. 900) also stated that, from his examination of the two Iranian specimens in the British Museum, "it appears that the Omanese bats may have a slightly smaller, more delicate skull than the specimens from Persia and S. Arabia, but more material will be required before this can be assessed." My measurements of the skull of the holotype of *T. p. macdonaldi* are as follows: GLS19.8 mm.; CBL 17.5 mm.; ZW 8.8 mm.; BB 8.9 mm; PO 2.8 mm.; C-M^3 7.0 mm.; M^3-M^3 4.2 mm.; C-M_3 7.5 mm.; ML 12.4 mm. All of these fall within the range of variation of the specimens from Iran (Appendix I).

It therefore seems apparent that neither color nor skull size can be used to distinguish *T. p. macdonaldi*. This form thus must be placed in synonymy with *T. p. persicus*.

Specimens Examined:

I have examined the cotype of *T. persicus* (BM 76.3.10.3, see above) from Shiraz, the specimens from Bushehr (BM 97.11.10.1), the series from Ahram (FMNH 96669-76, 96678-84) and that from Nikshahr (USNM 327980-88), as well as the holotype of *T. p. macdonaldi* from Oman (BM 67.1227).

Ecological Notes:

Neither the date nor circumstances of capture are available for the Bushehr specimen. The Shiraz specimens were shot on an evening in May just outside the city walls (Blanford, 1876, p. 19). The

Ahram specimens, which appear to be adults by epiphysial ossification, were mistnetted on 6, 8, 9, and 11 January 1963. Lay (1967, p. 52) speculated that they roost by day in "small holes, some large enough for a man to crawl into" in the clay slopes in the area. The Nikshahr series includes two males and five females collected on 9 and 10 January 1963. Harrison (1955, p. 902) collected eight of this form from a tunnel in Oman that was also inhabited by hundreds of *A. tridens*.

9. FAMILY VESPERTILIONIDAE

The vespertilionids are small to medium-sized bats without a leaf-like appendage on the nose (fig. 16A) (one genus, not found in Iran, has a noseleaf) and with a well-developed tragus (fig. 15A-C). The tail is long and entirely, or almost entirely, enclosed within the uropatagium (fig. 18C). The second finger has a single, small phalanx, and the postorbital process of the skull is lacking. The premaxillae lack palatal branches and the palate has a single median emargination (e.g., fig. 67). Nine genera are known from Iran:

Myotis Kaup, 1758
Vespertilio Linnaeus, 1758
Eptesicus Rafinesque, 1820
Nyctalus Bowdich, 1825
Pipistrellus Kaup, 1829
Barbastella Gray, 1821
Otonycteris Peters, 1859
Plecotus Geoffroy, 1818
Miniopterus Bonaparte, 1837

The genus *Myotis* is characterized by medium length; rather pointed ears; a relatively long, slender tragus (fig. 69); and a dental formula of I 2/3 C 1/1 P 3/3 M 3/3 = 38 (fig. 67). Six species are known from Iran.

The genus *Vespertilio* is characterized by a palatal emargination that is broader than deep and a dental formula of I 2/3 C1/1 P 1/2 M 3/3 = 32 (fig. 91). This genus is usually considered to contain only three species, and one of these, *V. murinus*, is found in Iran. The genus *Eptesicus* has the same dental formula (figs. 92, 94, 96) but a shallower palatal emargination than the genus *Vespertilio*. The genus *Pipistrellus* normally has a dental formula of I 2/3 C 1/1 P 2/2 M 3/3 = 34 (fig. 84), but one species, *P. savii*, frequently has the minute first upper premolar missing (fig. 84C). The presence or absence of this tooth is the major feature distinguishing *Eptesicus* from *Pipistrellus*.

Because of the variability of *P. savii*, some Soviet authors (including Kuzyakin, 1950; Bobrinskii et al., 1965; and Alekperov, 1966) have recognized only the single genus, *Vespertilio*. Since both *Eptesicus* and *Pipistrellus* range very widely and contain numerous species, most non-Soviet authors recognize three distinct genera: *Vespertilio*, *Eptesicus* and *Pipistrellus*, all of which have rather short ears and a short, blunt tragus (figs. 83, 90, 96). Five species of *Eptesicus* and three species of *Pipistrellus* are known from Iran. Two additional species of *Pipistrellus* may also occur there.

The genera *Nyctalus* and *Barbastella* have a dental formula like that of *Pipistrellus*, I 2/3 C 1/1 P 2/2 M 3/3 = 34 (figs. 76, 78, 80). The ears of *Nyctalus* are relatively short and rounded, and the tragus is short and expanded distally (fig. 79). The ears of *Barbastella* are large and joined together over the forehead, and the tragus is relatively long and pointed (fig. 81). Three species of *Nyctalus* and one of *Barbastella* are known from Iran. A second species of *Barbastella* may occur in northwest Iran.

The genus *Otonycteris* has long, large ears and a long pointed tragus (fig. 89). The dental formula is I 1/3 C 1/1 P 1/2 M 3/3 = 30 (fig. 88). A single species is known from Iran.

The genera *Plecotus* and *Miniopterus* have the dental formula I 2/3 C 1/1 P 2/3 M 3/3 = 36. *Plecotus* have very long ears that are joined over the forehead, and a long, pointed tragus (fig. 74). *Miniopterus* have very short ears and a small, rounded tragus (fig. 75). A single species of each is known from Iran.

KEY TO THE VESPERTILIONIDAE OF IRAN

1 Postcanine teeth 6/6 .... *Myotis* 2
1′ Postcanine teeth 4-5/5-6 7

2 Large, forearm greater than 50 mm., condylobasal length more than 20 mm. (fig. 67D) .... *Myotis blythi*

2′ Smaller, forearm less than 47 mm., condylobasal length less than 18 mm. .. 3

3 Wing membrane attached to the leg at or above the ankle (fig. 68A), never to the side of the digits; foot large, 11 to 13 mm. (cu); leg well furred *Myotis capaccinii*

3′ Wing membrane attaches to side of digits (fig. 68B); foot smaller, 7 to 11 mm. (cu); leg not furred 4

4 Ear and tragus long (figs. 69E, 70), ear 17 or more mm.; tragus 11 or more mm. 5

4′ Ear and tragus shorter (fig. 69B, D), ear 10 to 17 mm., tragus 7 to 10 mm. .. 6

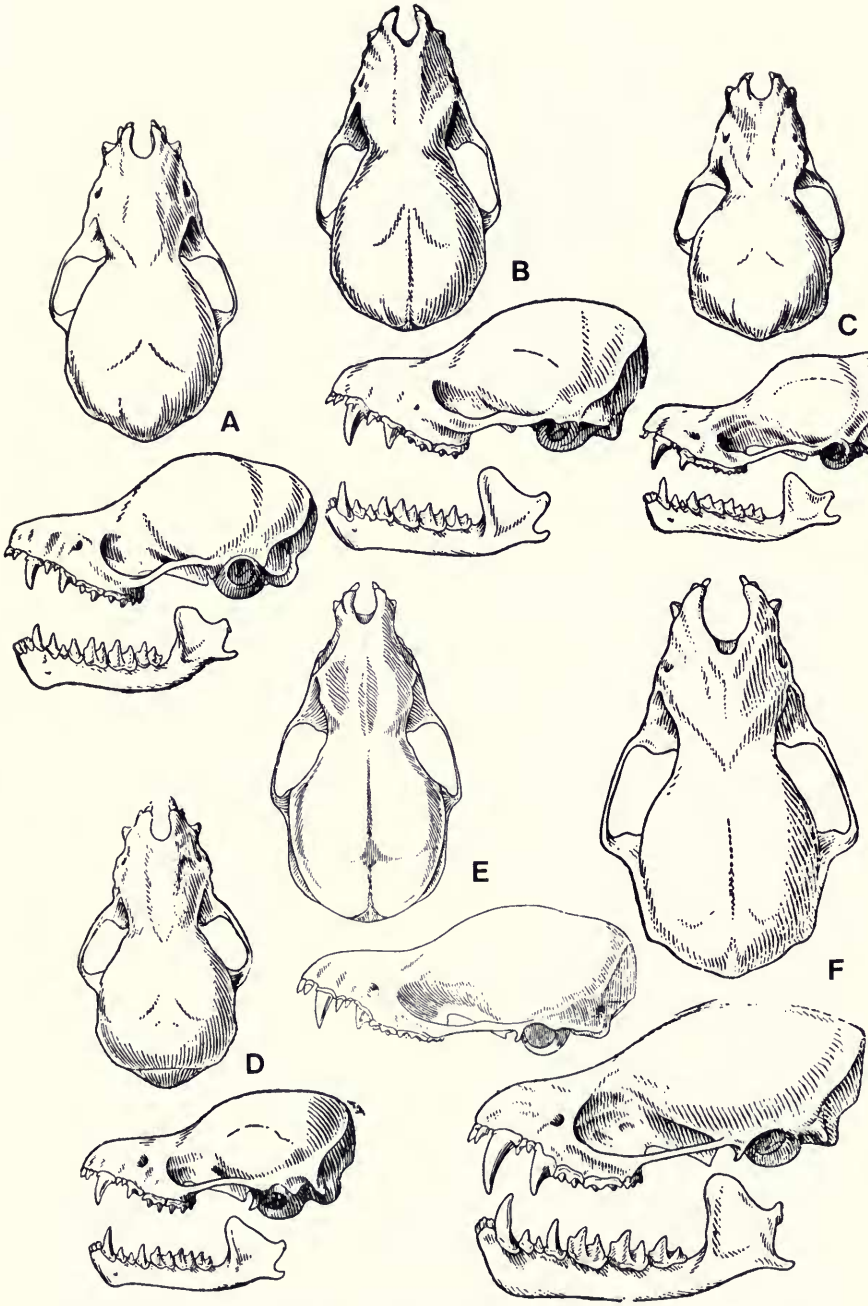

FIG. 67. The skulls of: **A,** *Myotis mystacinus;* **B,** *M. emarginatus*; **C,** *M. nattereri*; **D,** *M. capaccinii*; **E,** *M. bechsteini*; and **F,** *M. blythi* (Kuzyakin, 1950).

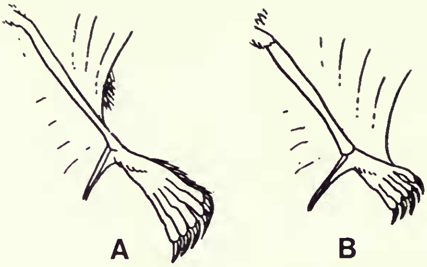

FIG. 68. Posterior wing attachment above ankle (**A**) in *M. capaccinii* and below ankle (**B**) in *M. mystacinus* and other Iranian members of this genus (Bobrinskii et al., 1965).

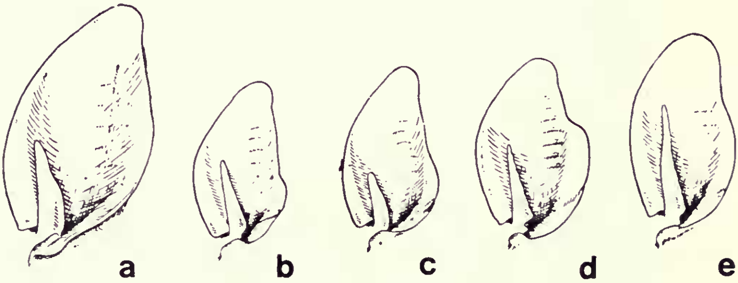

FIG. 69. Ears of: **a,** *Myotis blythi*; **b,** *M. mystacinus*; **c,** *M. capaccinii*; **d,** *M. emarginatus*; and **e,** *M. nattereri* (Gromov, 1963).

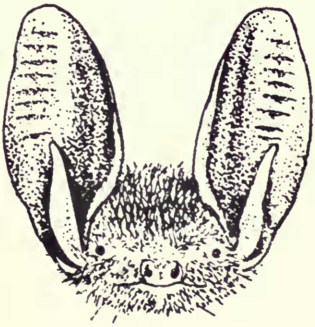

FIG. 70. Head of *Myotis bechsteini* showing very long ears and tragi (Gromov, 1963).

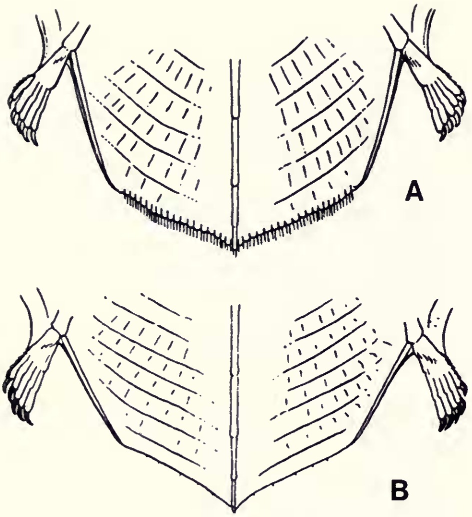

FIG. 71. Uropatagia of *Myotis nattereri* **(A)** with a posterior fringe of stiff hairs and of *M. emarginatus* **(B)** representing other Iranian *Myotis* that lack this fringe (Bobrinskii et al., 1965).

5 Ear very long (fig. 70), equal to or greater than one-half length of forearm; uropatagium with no or only few short stiff hairs projecting from posterior edge (e.g., fig. 71B) .... *Myotis bechsteini*

5′ Ear shorter (fig. 69E), less than one-half length of forearm; uropatagium with dense fringe of short stiff hairs projecting from posterior edge (fig. 71A) *Myotis nattereri*

6 Outer edge of pinna with a marked, almost right-angled indentation just above the middle (fig. 69D); size larger, forearm 37 to 46 mm., condylobasal length 14.5 to 16 mm. (fig. 67B) .... *Myotis emarginatus*

6′ Outer edge of pinna straight or with only a slight indentation just above the middle (fig. 69B); size smaller, forearm 30 to 37 mm., condylobasal length 11.5 to 14.5 mm. (fig. 67A) .... *Myotis mystacinus*

7 Upper postcanine teeth total 5 8

7′ Upper postcanine teeth total 4 19

8 Lower postcanine teeth total 6 (figs. 72, 73) 9

8′ Lower postcanine teeth total 5 10

9 Ears very long (fig. 74), only slightly shorter than the forearm, and joined across the top of the head .... *Plecotus austriacus*

9′ Ears short (fig. 75), less than half the length of the forearm, and not joined across the top of the head .... *Miniopterus schreibersi*

10 Fifth digit short, its entire length only slightly longer than the length of the metacarpal of the third or fourth digit .... *Nyctalus* 11

10′ Fifth digit normal, its entire length greater than the combined length of metacarpal and first phalanx of either the third or fourth digit 13

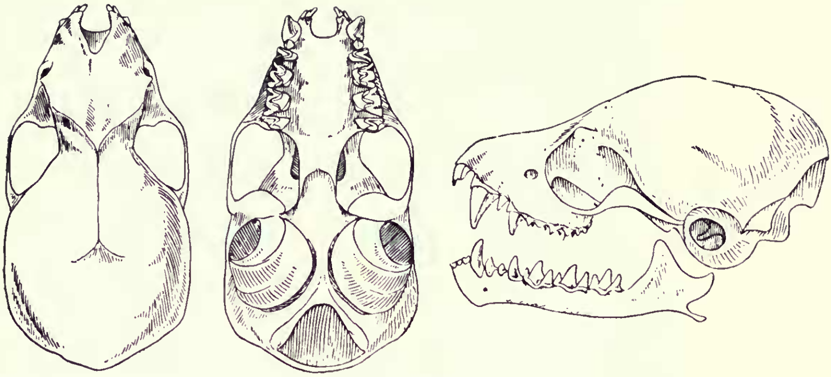

FIG. 72. Skull of *Plecotus austriacus* (Gromov, 1963).

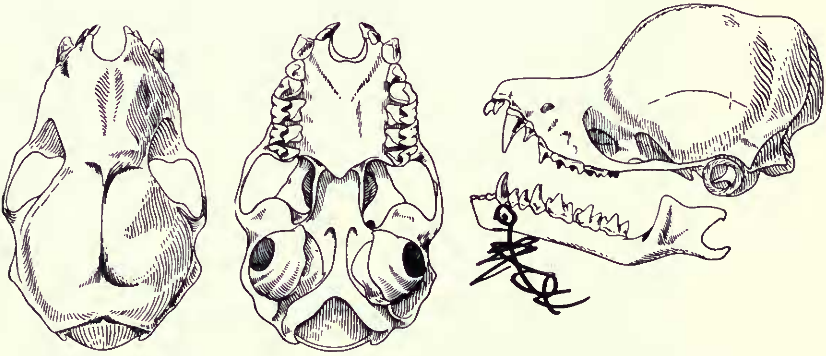

FIG. 73. Skull of *Miniopterus schreibersi* (Gromov, 1963).

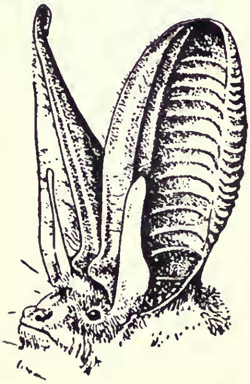

FIG. 74. Head of *Plecotus austriacus* (Gromov, 1963).

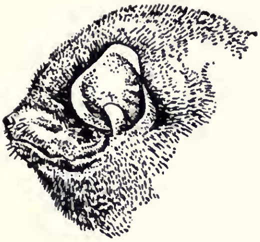

FIG. 75. Head of *Miniopterus schreibersi* (Gromov, 1963).

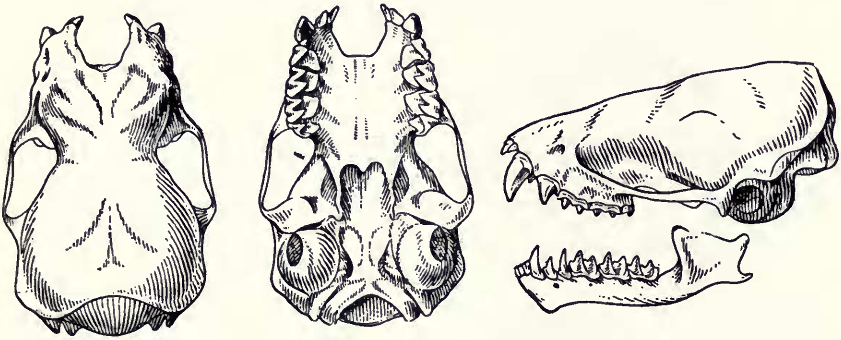

FIG. 76. Skull of *Nyctalus leisleri* (Kuzyakin, 1950).

11 Size small, forearm less than 47 mm., condylobasal length less than 17 mm. (fig. 76); P^1 in toothrow separating C and P^2 (fig. 77B); hairs on back with distinctly darker bases .... *Nyctalus leisleri*

11′ Size larger, forearm greater than 47 mm., condylobasal length greater than 17 mm. (fig. 78); P^1 absent or displaced lingually, C and P^2 in contact (fig. 77A); hairs on back without darker bases 12

12 Size smaller, forearm less than 60 mm., condylobasal length less than 21 mm. (fig. 78A) .... *Nyctalus noctula*

12′ Size larger, forearm more than 60 mm., condylobasal length more than 21 mm. (fig. 78B) .... *Nyctalus lasiopterus*

13 Upper surface of rostrum concave (fig. 80); ears joined across forehead (fig. 81) *Barbastella* 14

13′ Upper surface of rostrum convex (fig. 82); ears not joined across forehead (fig. 83) *Pipistrellus* 15

14 Ear with distinct nipple extending outward near mid-point of external edge of ear pinna (fig. 81A) .... *Barbastella barbastellus* (See Chapter 12)

14′ Ear without protrusion from external edge of pinna (fig. 81B) *Barbastella leucomelas*

15 Anterior upper premolar minute, its crown area much less than that of the second

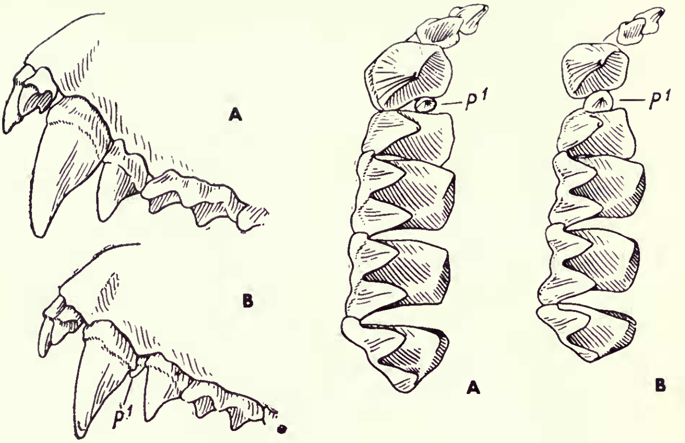

FIG. 77. Maxillary tooth rows of **(A)** *N. noctula* showing P^1 displaced lingually with C and P^2 in contact, and **(B)** *N. leisleri* showing P^1 in the tooth row between C and P^2 (Gromov, 1963).

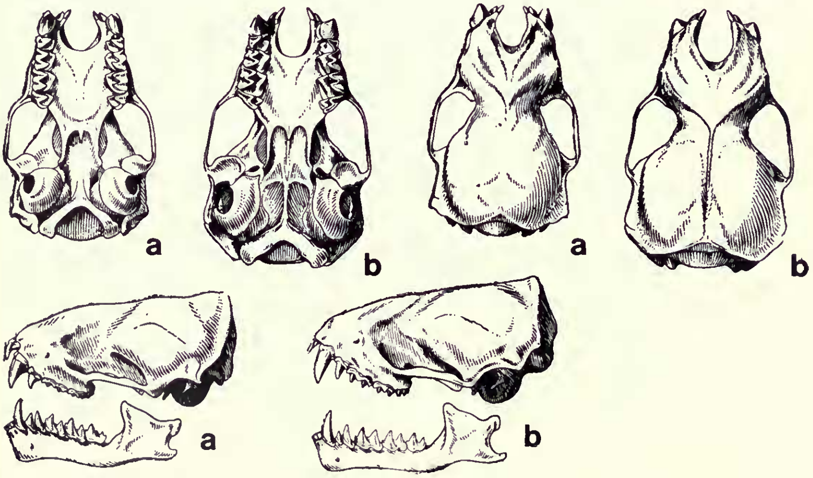

FIG. 78. Skulls of: **a,** *Nyctalus noctula*, and **b,** *N. lasiopterus* (Kuzyakin, 1950).

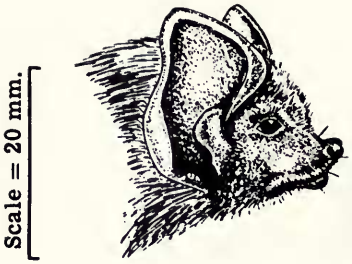

FIG. 79. Head of *Nyctalus noctula* (Harrison, 1964).

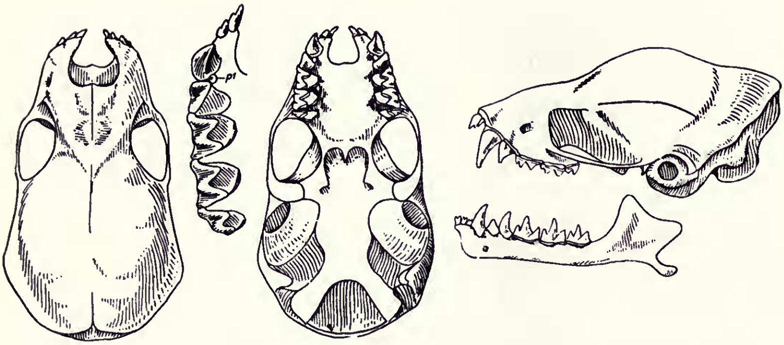

FIG. 80. Skull of *Barbastella leucomelas darjelingensis* (Gromov, 1963).

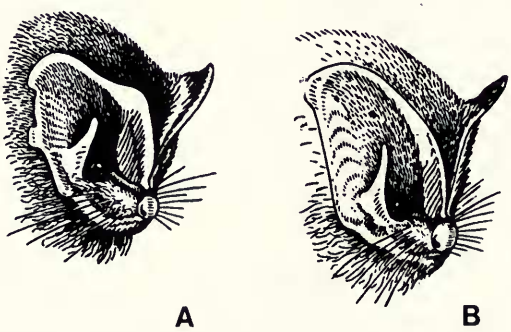

FIG. 81. Heads of: **A,** *Barbastella barbastellus*, and **B,** *B. leucomelas* (Gromov, 1963).

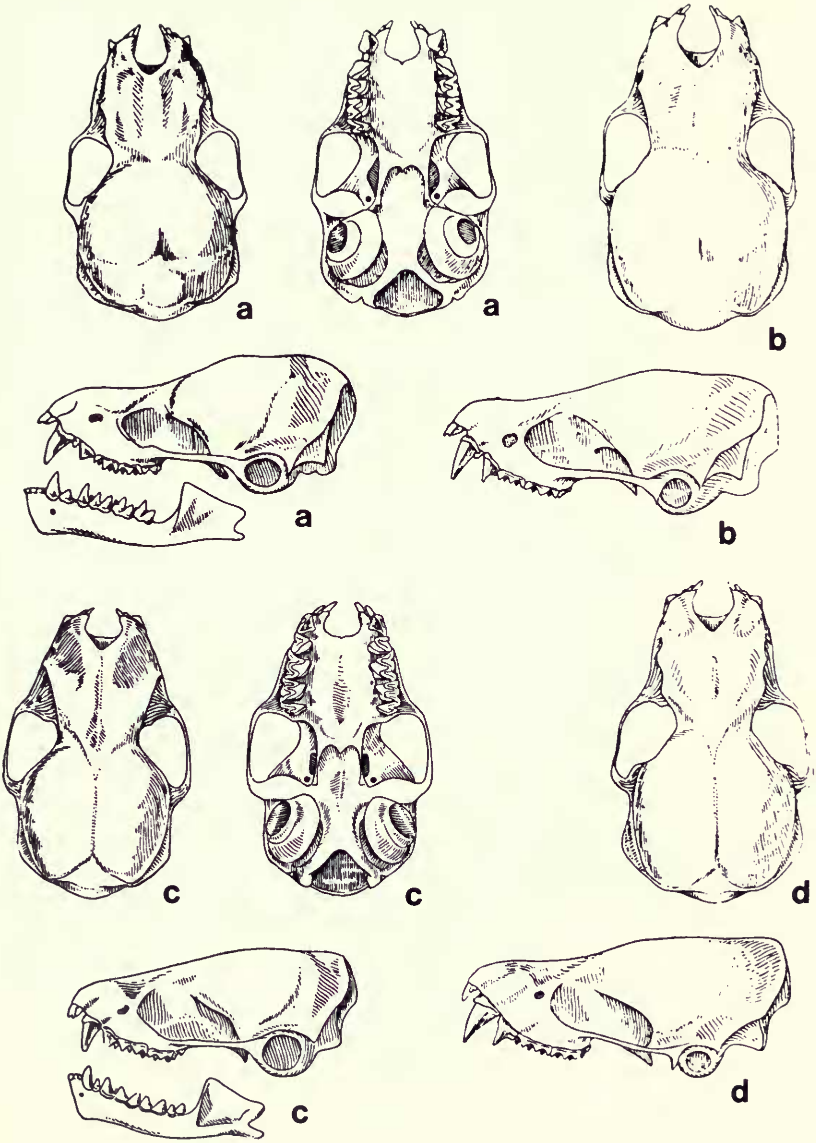

FIG. 82. Skulls of: **a**, *Pipistrellus pipistrellus*; **b**, *P. nathusii*; **c**, *P. savii*; and **d**, *P. kuhli* (Gromov, 1963).

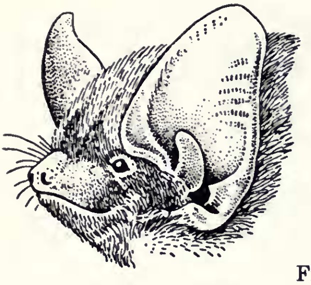

FIG. 83. Head of *Pipistrellus savii* (Gromov, 1963).

upper incisor (fig. 84C); greatest width of tragus about equal to height of anterior edge (fig. 83); wing and interfemoral membranes not edged in white *Pipistrellus savii*

15′ Anterior upper premolar small but equal to or larger than the second upper incisor in crown area (fig. 84A, B, and D); greatest width of tragus much less than height of anterior edge; wing and interfemoral membranes may be edged in white 16

16 First upper incisor usually unicuspid; second upper incisor short, less than half the height of the first (fig. 84D); second upper premolar usually in contact with canine; small first upper premolar displaced lingually and not visible in labial view of the skull (fig. 84D); white edges of membranes conspicuous; uropatagium with several conspicuous light stripes running from tail to leg (fig. 85C) *Pipistrellus kuhli*

16′ First upper incisor usually biscuspid; second upper incisor variable; second upper premolar separated from canine by a distinct gap, through which the small first upper premolar is visible in labial view of the skull (fig. 84A, B); wing and tail membranes may be narrowly edged in white (e.g., fig. 85B); uropatagium without light stripes 17

17 Second upper incisor very short (fig. 84E), barely exceeding cingulum of first; first upper premolar barely, if at all, displaced from toothrow; hairs on ventral surface pure white to base ....*Pipistrellus rueppelli* (See Chapter 12)

17′ Second upper incisor long (fig. 84A, B), more than half the length of the first; first upper premolar may be displaced inward from toothrow (fig. 84A); hairs on ventral surface with light tips and dark bases 18

18 Fifth finger longer, over 43 mm.; thumb long, longer than width of wrist (fig. 86A); calcar usually branched (fig. 87B); wings with indistinct narrow light posterior margin; second and third lower incisors separated by a distinct gap *Pipistrellus nathusii* (See Chapter 12)

18′ Fifth finger shorter, less than 43 mm.; thumb short, equal to or less than width of wrist (fig. 86B); calcar usually not branched (e.g., fig. 87A); wings with conspicuous white posterior margin (*P. p. aladdin*) (fig. 85B), or no light posterior margin (fig. 85A); second and third lower incisors in contact . . .*Pipistrellus pipistrellus*

19 Incisors 1/3 (fig. 88); ears longer (fig. 89), over half the length of the forearm *Otonycteris hemprichi*

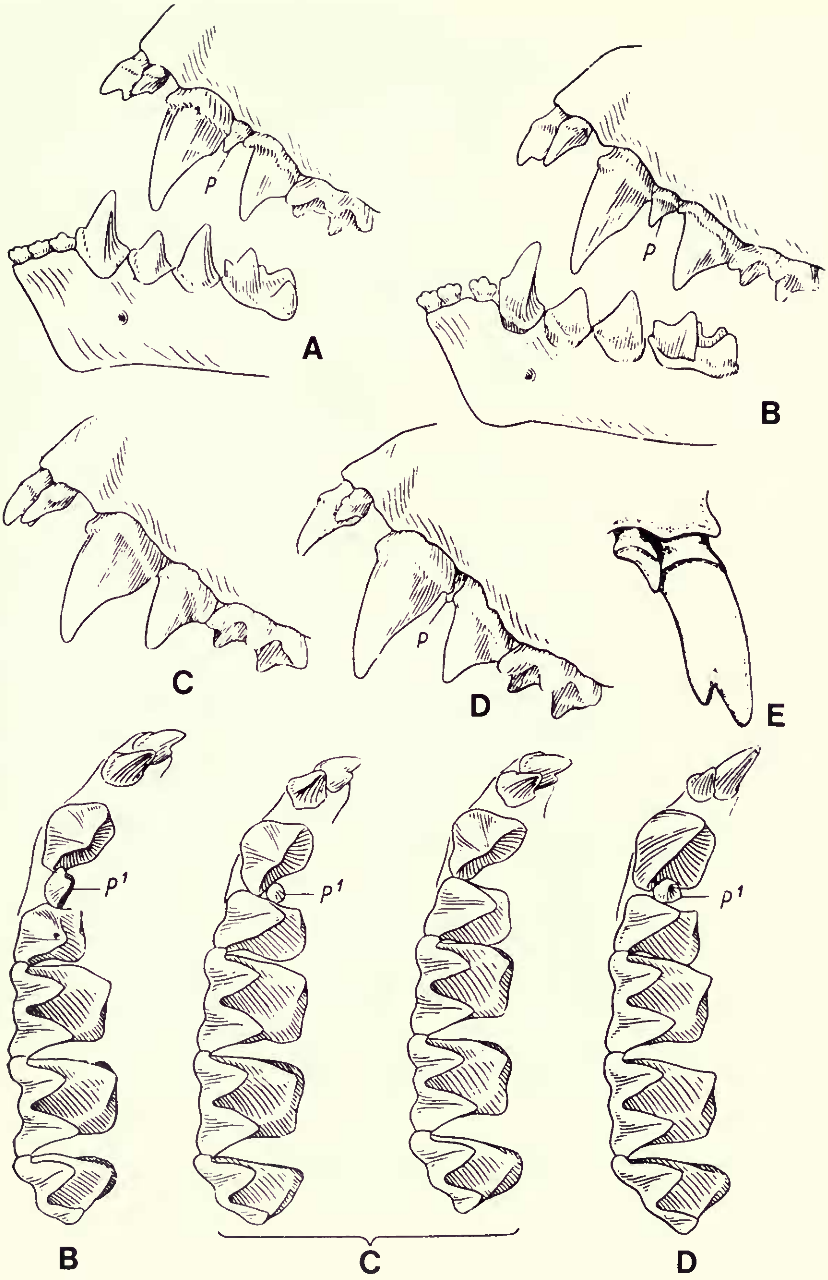

FIG. 84. Teeth of: **A,** *Pipistrellus p. pipistrellus*; **B,** *P. nathusii*; **C,** *P. savii*; **D,** *P. kuhli*; and **E,** *P. rueppelli*. A, lateral; B, C, and D, lateral and occlusal views; E, lateral view of incisors only. (A through D, Gromov, 1963; E, Harrison, 1964).

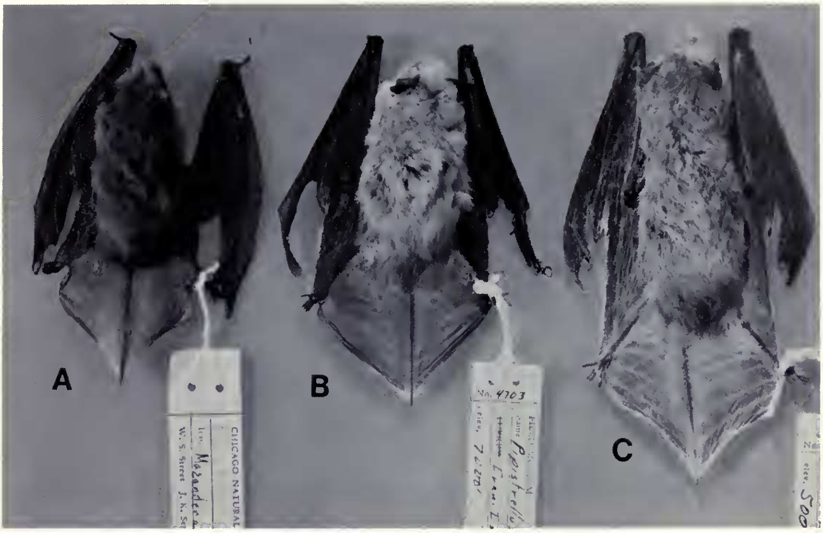

FIG. 85. Study skins of: **A,** *Pipistrellus p. pipistrellus*; **B,** *P. p. aladdin*; and **C,** *P. kuhli.*

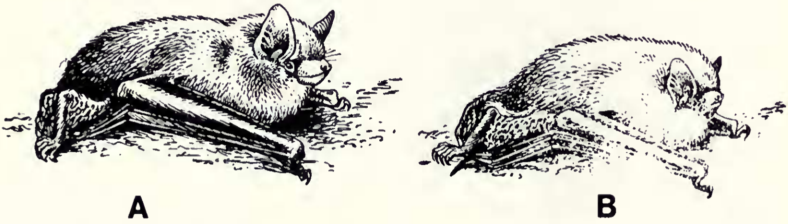

FIG. 86. **A,** *Pipistrellus nathusii* and **B,** *P. pipistrellus* (Kuzyakin, 1950).

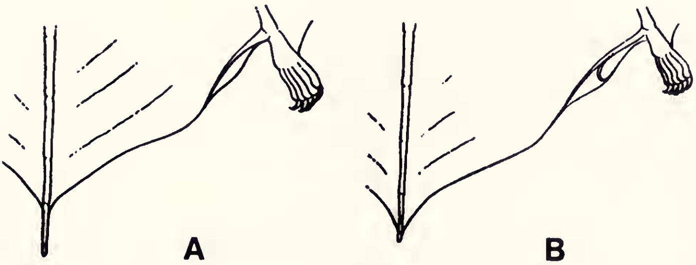

FIG. 87. Calcars of: **A,** *Pipistrellus savii* and **B,** *P. nathusii* (Bobrinskii et al., 1965).

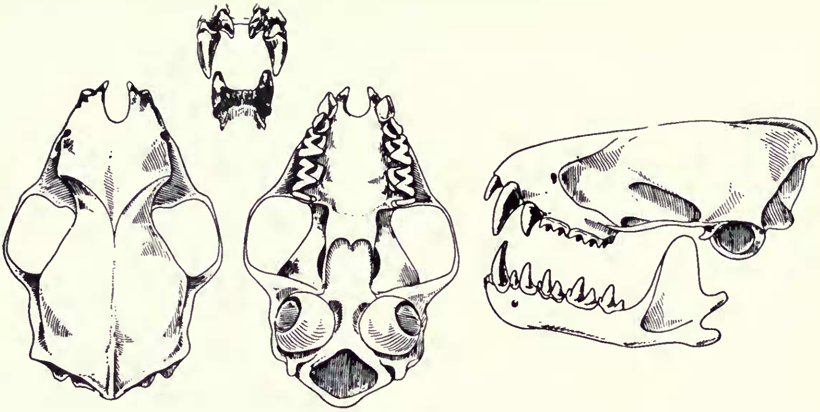

FIG. 88. Skull of *Otonycteris hemprichi* (Gromov, 1963).

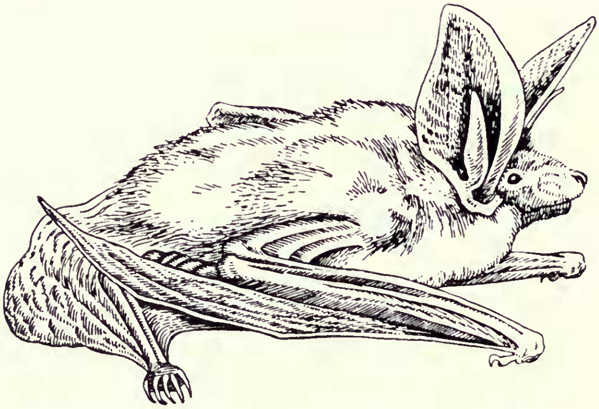

FIG. 89. *Otonycteris hemprichi* (Gromov, 1963).

19′ Incisors 2/3; ears shorter (fig. 96), less than half the length of the forearm . .20

20 Palatal emargination deeper than broad (fig. 91); dorsal pelage dark with many white-tipped hairs, giving a "frosted" appearance (fig. 90) . . *Vespertilio murinus*

20′ Palatal emargination broader than deep; dorsal pelage variable but never "frosted" with white .... *Eptesicus* 21

21 Larger, forearm longer than 41 mm.; condylobasal length 14.7 to 22 mm., greatest length of skull longer than 16 mm. .... .22

21′ Smaller, forearm less than 43 mm.; condylobasal length 12.2 to 15.5 mm., greatest length of skull less than 16 mm. .... .23

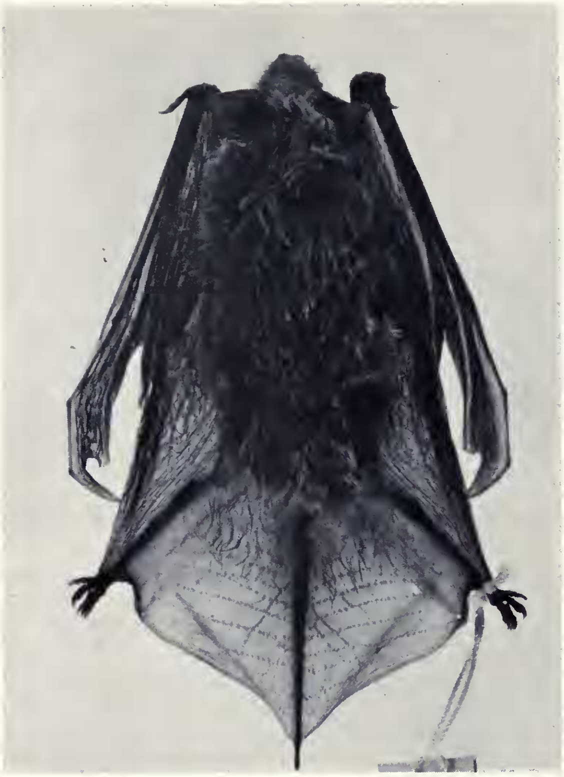

Fig. 90. Skin of *Vespertilio murinus* from Sar Dasht (FMNH 111499).

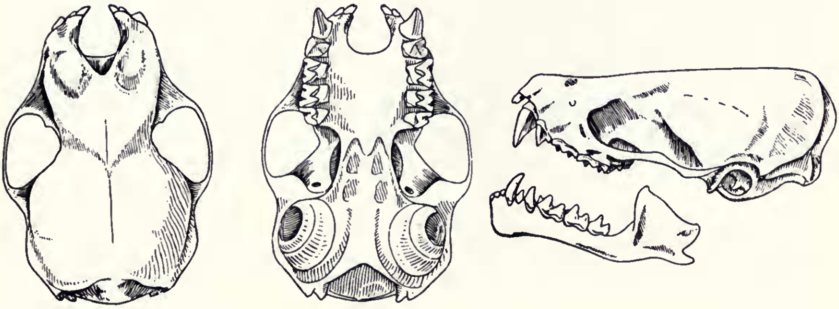

Fig. 91. Skull of *Vespertilio murinus* (Gromov, 1963).

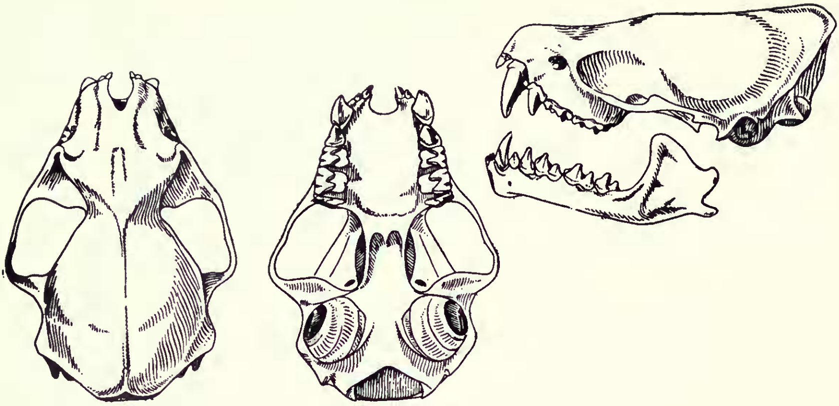

FIG. 92. Skull of *Eptesicus serotinus* (Gromov, 1963).

22 Larger, condylobasal length 19 to 21.6 mm., greatest length of skull 23.3 to 25.5 mm. (fig. 92); forearm 47 to 58 mm.; dorsal pelage dark, or if light, hair bases lighter than tips (fig. 93) .... *Eptesicus serotinus*

22′ Smaller, condylobasal length 14.7 to 17.9 mm., greatest length of skull 16.1 to 18.5 mm. (fig. 94); forearm 40 to 49.1 mm.; dorsal pelage light, hairs with distinctly darker bases (fig. 95) .... *Eptesicus bottae*

23 Rostrum narrow, width at canines not more than 0.2 mm. wider than interorbital constriction (fig. 97B); forearm 33.5 to 36 mm.; condylobasal length 14.0 to 14.6 mm. .... *Eptesicus bobrinskoi*

23′ Rostrum wide, width at canines more than 0.2 mm. wider than interorbital constriction (e.g., fig. 97A); forearm 33 to 43 mm., condylobasal length 12.2 to 15.5 mm. 24

24 Terminal caudal vertebra enclosed within the uropatagium; wing membranes near body usually studded with small warty projections (caused by parasitic nematodes) visible in fresh and spirit specimens, visible only as spots in dry specimens (fig. 98) .... *Eptesicus nasutus*

24′ Terminal caudal vertebra projecting beyond uropatagium (e.g., fig. 88A); no "warts" or spots on wing membrane 25

25 Larger, condylobasal length 14.2 to 15.5 mm. (fig. 97A); forearm 37 to 43 mm. *Eptesicus nilssoni*

25′ Smaller, condylobasal length 12.2 to 14.3 mm. (fig. 82C); forearm 33 to 40 mm. *Pipistrellus savii*

Myotis mystacinus (Kuhl)

Vespertilio mystacinus Kuhl, 1819, Ann. Wetterau. Ges. Gesammte Naturk, 4, 2, p. 202.

Type Locality.—Germany.

Type Specimen.—Probably not in existence (Allen, 1938, p. 215).

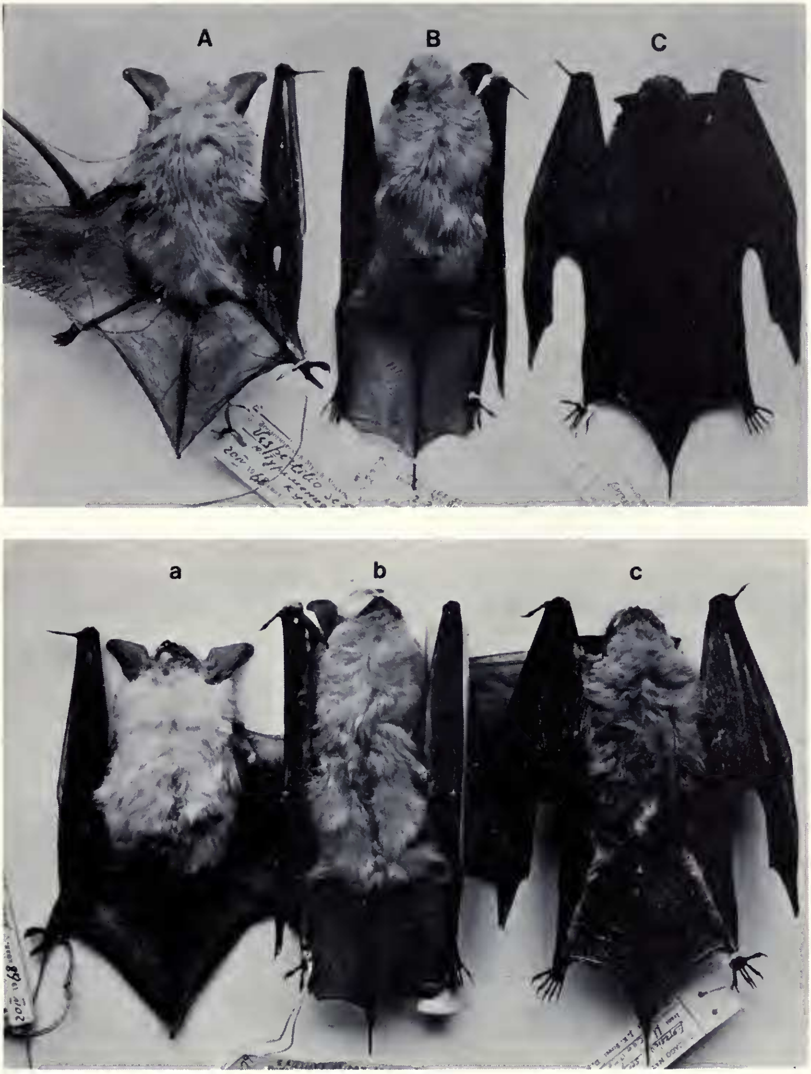

FIG. 93. Dorsal (**A, B,** and **C**) and ventral (**a, b,** and **c**) views of study skins of: **Aa,** *Eptesicus serotinus turcomanus*; **Bb,** *E. s. shiraziensis*; and **Cc,** *E. s. serotinus*.

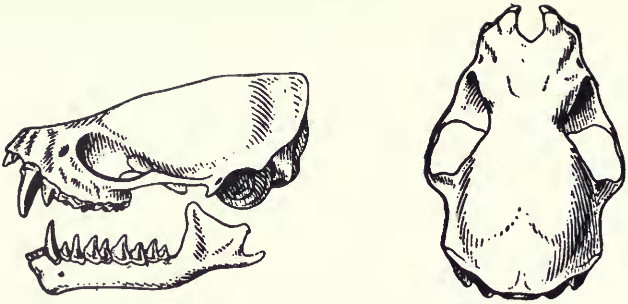

FIG. 94. Skull of *Eptesicus bottae* (Kuzyakin, 1950).

General Range:

Morocco (Hayman and Hill, 1971, p. 34). Throughout Europe except southern Iberian Peninsula, northern British Isles and northern Scandinavia (van den Brink, 1968, p. 57). USSR south of the Arctic Circle from Europe to Kamchatka and Vladivostok (Bobrinskii et al., 1965, Map 24). Turkey (Osborn, 1963, p. 212; Kumerloeve, 1975A, p. 87). Northern Afghanistan (Neuhauser, 1969, p. 68). Pakistan (Roberts, 1977, p. 64). China (Allen, 1938). Japan (Wallin, 1969, p. 266). Mongolia, Korea, Kashmir, and Nepal (Ellerman and Morrison-Scott, 1951, p. 139 [excluding *muricola*]).

Gauckler and Kraus (1970) have determined that *M. brandti*, formerly regarded as a subspecies of *M. mystacinus*, is a valid species, and they have suggested that much of the Soviet and eastern European range listed above is occupied only by *M. brandti*.

Iranian Distribution:

Records of *M. mystacinus* from Iran are listed in Table 14 and mapped in Figure 99. In addition to these, Ognev (1928, p. 347) listed Baluchistan and "southern Persia" for this species but mentioned no specimens or precise localities.

This species has been collected in scattered localities throughout most of northern Iran. It also likely extends south through the Zagros beyond Kermanshah but probably does not occur in Baluchistan or southern Persia, as stated by Ognev (1928, p. 347).

Subspecies:

None of the authors who have reported *M. mystacinus* from Iran have designated subspecies. Misonne (1959, p. 25) listed *M. m.*

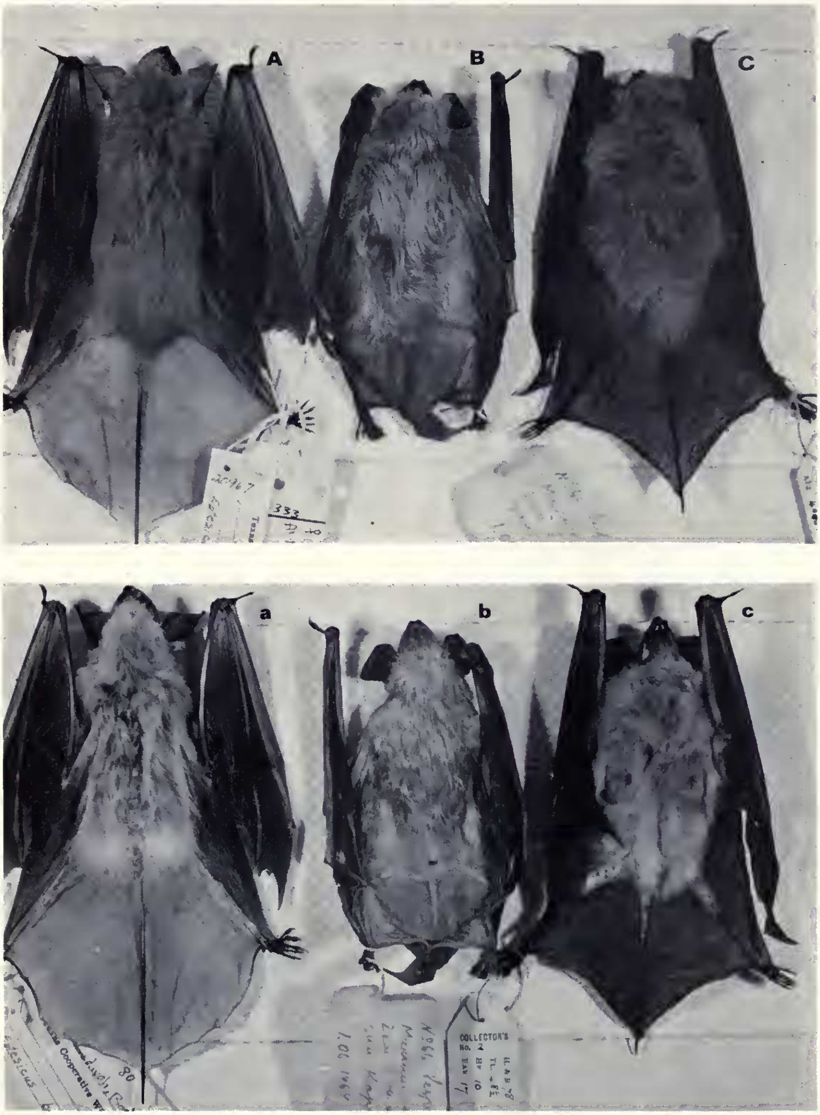

FIG. 95. Dorsal (**A, B,** and **C**) and ventral (**a, b,** and **c**) views of study skins of: **Aa,** *Eptesicus bottae hingstoni*; **Bb,** *E. b. ognevi*; and **Cc,** *E. b. anatolicus.*

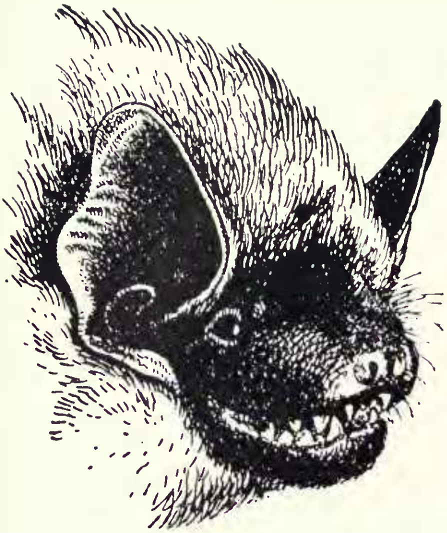

FIG. 96. Head of *Eptesicus serotinus* (Kuzyakin, 1950).

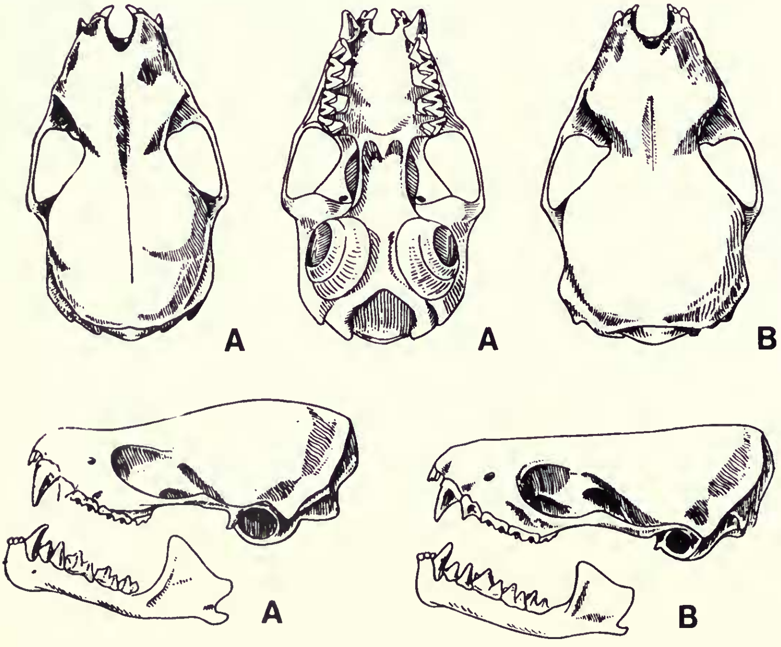

FIG. 97. Skulls of: **A,** *Eptesicus nilssoni*, and **B,** *E. bobrinskoi* (Gromov, 1963).

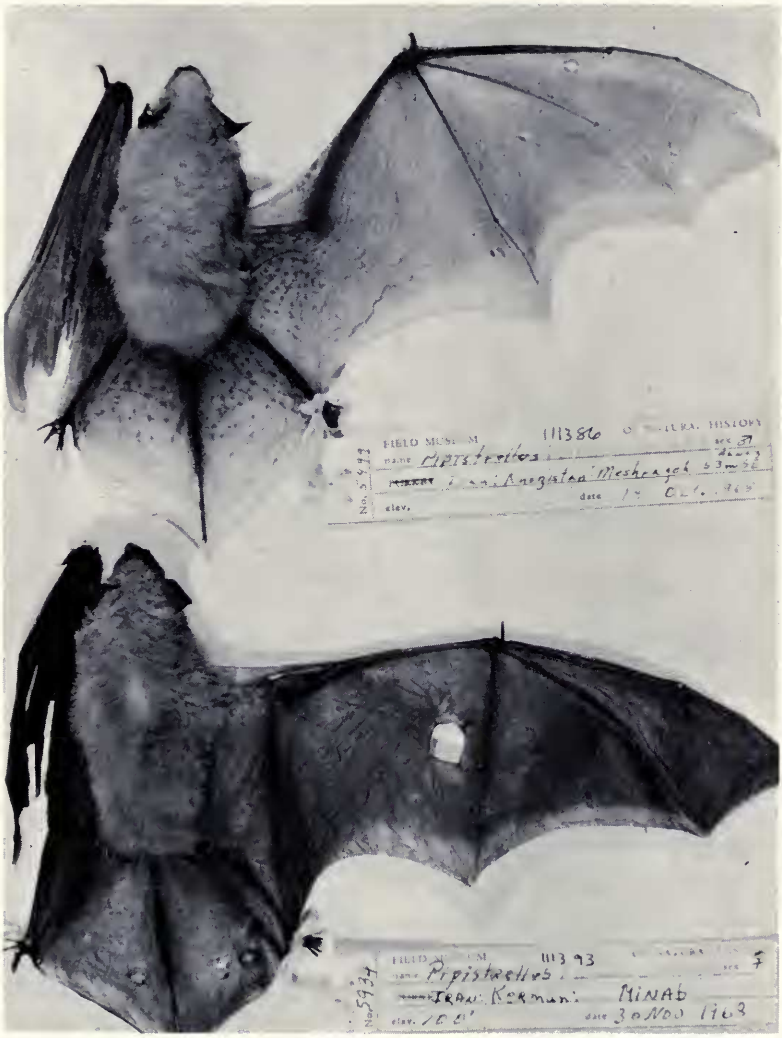

FIG. 98. *Eptesicus nasutus pellucens* (top) from Meshrageh and *E. n. nasutus* (bottom) from Minab, Iran.

TABLE 14. Records of *Myotis mystacinus* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Satunin (1909, p. 31)	Astrabad (=Gorgan)	MAZ	1	—	—	—	
Bianki (1917, p. viii)	Ashur-ade (=Ashuradeh-ye-Bozorg)	MAZ	1	—	—	—	
Harrison (1963)	Sulphur Caves, Guter-Su (=Kutur Su)	EAZ	3	3♂	21 Aug. 1961	BM 36.1196-8	Found dead in Sulphur Cave on N side Mt. Sabalan.
Lay (1967, p. 140)	8 km. N Gorgan	MAZ	1	1♂	29 Oct. 1962	FMNH 96428	Adult; shot over pool.
	Sama	MAZ	1	1♀	18 Aug. 1962	FMNH 96436	Immature; mistnetted over stream.
	2 km. W Maku	WAZ	1	1♀	5 Oct. 1962	FMNH 96439	Adult; collected over stream.
	10 km. SW Rezaiyeh	WAZ	1	1♂	14 Sept. 1962	FMNH 96437	Adult; found hanging "alone in a dimly-lit water powered grist mill that was operated daily."
	18 km. SW Rezaiyeh	WAZ	1	1♀	24 Sept. 1962	FMNH 96438	Adult; collected over water.
Farhang-Azad (1970)	15 km. W Chalus	MAZ	1	1♀	12 June 1969	IPHR 63	Khoshamian Forest, lactating.
	Siahkal	GIL	1	1♂	15 June 1969	IPHR 89	—
	71 km. SE Mashhad	KHR	1	—	29-30 July 1969	—	—
New Records	6.4 km. N Kermanshah	KRS	1	1♀	20 Aug. 1968	FMNH 111236	Adult; mistnetted over stream.
	8 km. N Kermanshah	KRS	2	1♂ 1♀	22, 25 Aug. 1968	FMNH 111234; 111237	Adults; purchased, said to be collected from building in village.
	Tehran	CEN	1	1♂	23 July 1952	SMNS 4056	Immature.

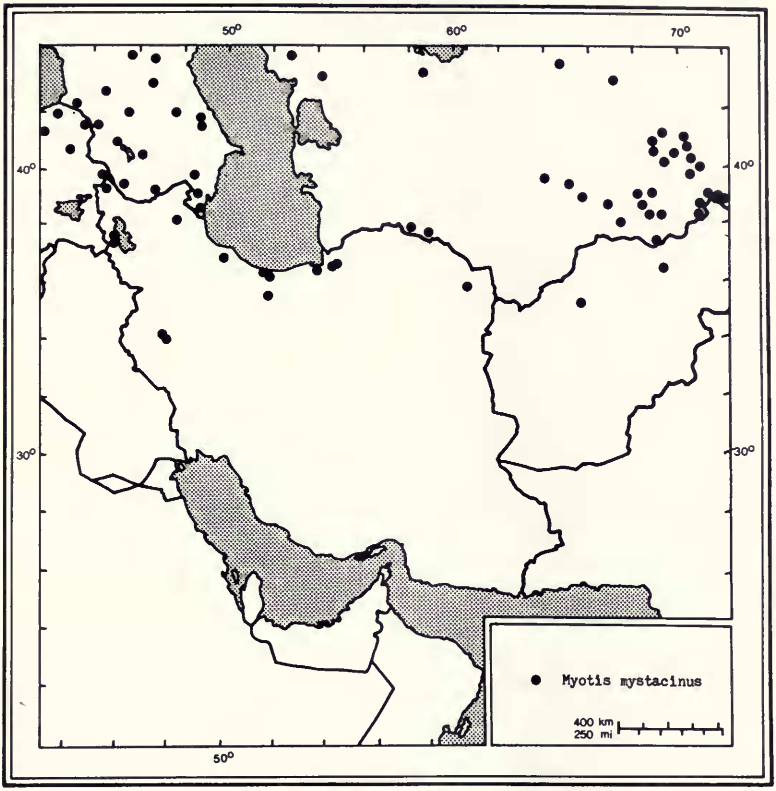

FIG. 99. Distribution of *Myotis mystacinus.*

transcaspicus in his work on Iranian mammals and said that, although no capture had yet been made in Iran, this form had been found in the immediate proximity of the Turkmenistan frontier.

Ognev (1928, p. 348), in describing *M. m. transcaspicus*, said that it "is very close to *M. mystacinus prezwalskii*." Recent Soviet authors (Kuzyakin, 1950; Bobrinskii et al., 1965) included all of the Transcaspian region and the Caucasian and Transcaucasian areas in the range of *M. mystacinus prezwalskii* Bobrinskii, 1926. Bobrinskii et al. (1965, p. 96) distinguished *M. m. prezwalskii* by its relatively tall braincase (only 0.5 to 0.8 mm. wider than tall as opposed to 1.2 to 1.5 mm. wider than tall in the nominate form), by the minute size of the second upper premolar, and by the lingual displacement of this tooth. Ognev (1928, p. 348) had mentioned these same characters in his description of *M. m. transcaspicus*.

I have examined the skulls of nine *M. mystacinus* from Iran for these characteristics and have found considerable variation. The two specimens from Kermanshah, the two from Rezaiyeh, and the one from Sama have a braincase that is only 0.4 to 0.8 mm. wider than tall. However, the three specimens from Kutur Su all have a braincase 1.2 mm. wider than tall. The Kermanshah female and the female from Sama have P^2 small and displaced lingually while P^1 and P^3 are almost in contact. The two Rezaiyeh specimens and the male from Kermanshah have P^2 small but not nearly as lingually displaced. The male from Tehran has P^2 slightly larger and situated between P^1 and P^3 (fig. 100).

Harrison (1963, p. 302), after examining these characteristics in the Kutur Su series, said that "these characters are not clearly apparent in the present specimens and it appears wiser to leave the question of their subspecific determination open, pending the collection of further material." More material has been collected and examined, but the picture is still unclear and I must echo Harrison's statement.

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are listed in Table 14, I have examined three from Afghanistan (FMNH 102489, 102579, 102761) and one from the USSR (BM 44.8.7.28).

Ecological Notes:

It is apparent from the data listed in Table 14 that little is known about the ecology of *M. mystacinus* in Iran. It occasionally roosts in buildings and has been known to enter caves. Immature specimens (by epiphysial ossification) have been collected only on 23 July and 18 August and a lactating female was taken on 12 June. The most conspicuous ecological factor listed in the table is the close relationship between this species and water.

Myotis emarginatus (Geoffroy)

Vespertilio emarginatus Geoffroy, 1806, Ann. Mus. Hist. Nat., Paris, 8, p. 198.

Type Locality.—Charlemont, Givet, Ardennes, France.

General Range:

Morocco and Algeria (Hayman and Hill, 1971, p. 34). Europe irregularly from northern France to Sicily and Thrace (van den Brink,

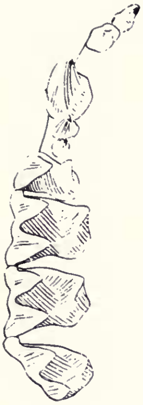

FIG. 100. The maxillary toothrow of a *Myotis mystacinus* with P^2 situated between P^1 and P^3 (Gromov, 1963).

1968, p. 57). USSR along the southern border from Europe to the vicinity of Tashkent (Bobrinskii et al., 1965, Map 24). Israel (Harrison, 1964). Afghanistan (Kuzyakin, 1950, p. 267; Meyer-Oehme, 1965, p. 5).

Iranian Distribution:

Iranian records are listed in Table 15 and mapped in Figure 101. *Myotis emarginatus* has been reported from the very arid regions of Persian Baluchistan, the more moderate regions of the Zagros Mountains, and the lush Caspian coastal plain. With this wide range of habitat tolerance, it is probable that this species ranges over the entire country with the possible exception of the central deserts.

Subspecies:

Myotis emarginatus emarginatus (Geoffroy) (see above)

Myotis emarginatus desertorum (Dobson)

Vespertilio desertorum Dobson, 1875, *in* Blanford, Ann. Mag. Nat. Hist., **16**, p. 309.

Type Locality.—Jalk (=Jalq), Baluchistan, Iran.

Cotypes.—Three females in the British Museum collection, BM 47.11.21.29 in alcohol with skull not extracted; BM 47.11.21.30 and BM 9.1.4.33, both in alcohol with skulls extracted and cleaned.

Range.—SE Iran, perhaps also NE Iran, Soviet Turkmeniya, and Afghanistan.

Table 15. Records of *Myotis emarginatus* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Blanford (1875, p. 309; 1876, p. 20)	Jalk (=Jalq)	SAB	3	3♀	1879 [sic]	BM 9.1.4.33, 47.11.21.29-30	Cotypes of *Vespertilio desertorum* Dobson 1875.
Thomas (1920A, p. 933)	Shastun (=Shaustun)	SAB	1	1♀	28 July 1916	BM 19.11.8.2	Holotype of *Myotis lanaceus* Thomas 1920, adult.
Kuzyakin (1950, p. 267)	Mashhad (Lay 1967, p. 232)	KHR	?	—	—	—	
Lay (1967, p. 232)	Barfurush (=Babol)	MAZ	3	1♂ 1♀ 1 ?	4 and 6 July (year?)	BM 27.10.26.2-4	"House of Imperial Bank of Persia."
Etemad (1967, p. 277)	Azad Khan Cave, Mahalat (=Mahallat)	CEN	1	1♀	Summer, 1964	—	
	Babolsar (=Babol)	MAZ	1	1♂	—	—	
Etemad (1969, p. E10)	Konar-Takhteh, Kazerun	BSH	1	1♀	Spring, 1965	—	
Farhang-Azad (1969, p. 731)	Chelmir	KHR	4	1♂ 3♀	16 July 1968	IPHR 712 and 2 uncat.	Mistnetted over stream.
New Records	Mar Ab Canyon, 57 km. W Shahabad	KRS	2	1♂ 1♀	25 Aug. 1968	FMNH 111238-9	See "Ecological Notes" section.
	Kazerun	FAS	1	1♀	June, 1968	IPHR uncat.	
	Tir Tash	MAZ	1	1♀	28 Aug. 1970	BM 71.1646	
	Tir Tash	MAZ	20	6♀ 14♀	4 Sept. 1970	BM 71.1648-64 and MMTT 2 uncat.	"From roost in loft of Tobacco Institute."

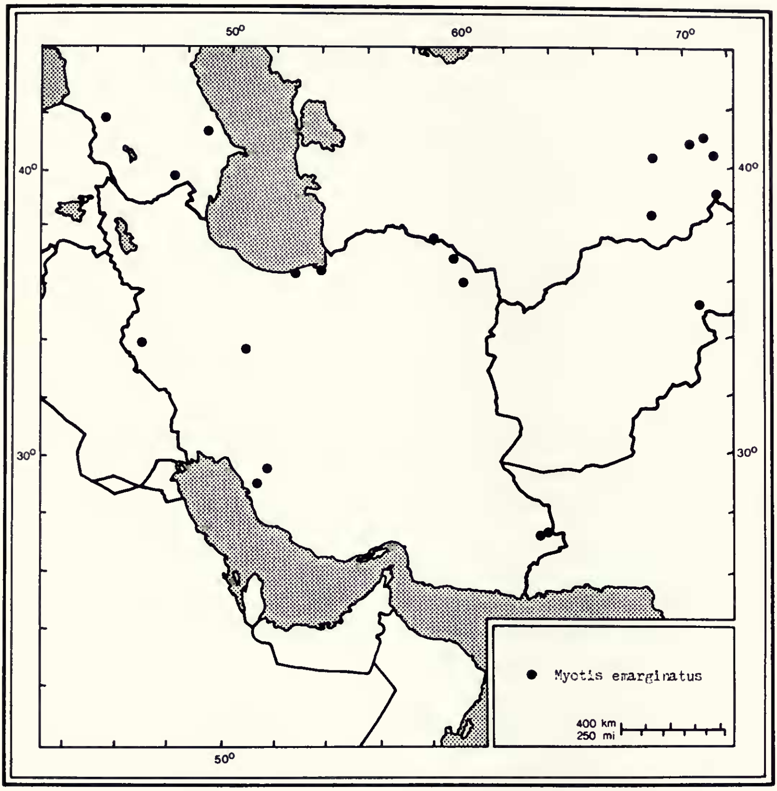

FIG. 101. Distribution of *Myotis emarginatus.*

Myotis emarginatus subsp.?

Two forms of *M. emarginatus* have been described from Iran. Dobson described the form *desertorum* from Jalq, Baluchistan (Blanford, 1875, p. 309) and Thomas (1920A, p. 933) described the form *lanaceus* from Shaustun, Dizak District, Baluchistan. The two type localities are only about 50 km. apart. Both forms were described as being larger and lighter than the nominate form. Ognev (1928, p. 342) synonymized these two forms under the older name, and he and the more recent Soviet authors (Kuzyakin, 1950; Bobrinskii et al., 1965) have recognized *M. e. desertorum* as the form which inhabits Soviet Turkmeniya and eastern Iran.

Bobrinskii et al. (1965, p. 95) included specimens from Transcaucasia in the nominate subspecies and distinguished between this form and *desertorum* solely on the basis of color. They described *M. e. emarginatus* as having the tips of the dorsal hairs brown or reddish-brown and *M. e. desertorum* as being lighter and brighter with the tips of dorsal hairs brick-red. They did not comment on the ventral coloration of the two forms, but the bat labeled *M. emarginatus* in their color plate VI has a reddish-brown dorsum and a grayish-white venter. Etemad (1969, p. 118) referred the specimens from northern Iran to *M. e. emarginatus*, and he referred the specimens from southern Iran to *M. e. desertorum* on the basis of their lighter color and larger size.

The color of the Iranian *M. emarginatus* specimens is highly variable. The three cotypes of *desertorum* were described as having "light brown" hair tips (Blanford, 1876, p. 20). The holotype of *lanaceus* was described as "general colour greyish buffy" with dorsal hairs having an "inconspicuous tawny tip" (Thomas 1920A, p. 933). I have examined all four of these specimens. The *lanaceus* holotype is a very light reddish on the dorsum and has a white venter with only a slight hint of reddish wash. The three *desertorum* cotypes are preserved in spirit so that color comparisons are difficult, but the specimens do appear to be very light-colored, with only slight traces of red dorsally and ventrally.

The three Babol specimens have a very red pelage, with hairs of both the dorsum and ventrum conspicuously tipped with brick-red. The Chelmir specimens are fairly dark, but the MMTT specimens from Tir Tash are much more yellowish.

In describing his *M. e. emarginatus* from Lebanon and Israel, Harrison (1964, p. 126) said:

> The colour is distinct and exhibits relatively little variation in the large series examined ... The general effect is for the orange brown hair tips (nearly matching B. 9. Wild Honey. Plate 13, Maerz and Paul, 1950) to predominate, and grey bases showing through slightly. The ventral surface is paler, a clear and rather uniform orange-tinted buffy brown ...

The single dry specimen from Mar Ab Canyon has an overall dorsal color matching Wild Honey of Maerz and Paul (1950, pl. 13), but the hair tips are considerably darker, matching Bay (Maerz and Paul, 1950, pl. 7). The ventral pelage is considerably lighter and whiter. The dorsal and ventral pelage of the IPHR specimen from Kazerun is similar to the dorsal color of this Mar Ab specimen.

Using only gross color differences I must conclude that the Mar Ab Canyon specimens and Etemad's Kazerun specimens should be designated *M. e. emarginatus* and the three Baluchistan specimens designated *M. e. desertorum*. The Babol specimens are different in color from both the nominate form and *M. e. desertorum* and perhaps represent a third form. However, the Tir Tash specimens appear to be the nominate race. Many more specimens from more locations are needed before the relationships of these three color types are understood.

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are listed in Table 15, I have examined three from France (FMNH 74211-13).

Ecological Notes:

The one male and one female *M. emarginatus* collected at Mar Ab Canyon were two of the approximately 10 individuals of this species roosting under huge, jumbled boulders on 25 August 1968 (for a detailed description of this collecting site see the Ecological Notes section of *Rhinolophus ferrumequinum*).

Bobrinskii et al. (1944, p. 83) said that *M. emarginatus* in the Soviet Union may be found in summer in caves and under domes of ancient mausoleums, churches, and mosques. Harrison (1964, p. 129) gave a graphic description of a large colony of several hundred *M. emarginatus* observed in a cave at Mt. Carmel on 6 May 1962. All 26 bats collected from this colony were females and 21 of these contained a single embryo. Ognev (1928, p. 343) mentioned a pregnant female with "one rather well-developed embryo" shot on "24(6) May 1925."

Since pregnant females are noted in Israel (Harrison, 1964, p. 129) and the USSR (Ognev, 1928, p. 343) in early May and since the three Chelmir females contained no embryos in July (Farhang-Azad, 1969, p. 731), it can be assumed that young are born in June or late May. By my own observation one of the Chelmir specimens collected in July is a barely volant immature. The male from Barfurush (=Babol) is an immature which, together with the early July date, indicates that the bank was used as a nursery site.

The Mar Ab Canyon specimens are adults. There was not enough guano under the roosting sites to indicate that this location was used as a nursery and it was much too exposed to be used as a hibernaculum. It is most likely only a temporary roost used during fall movements to their hibernacula.

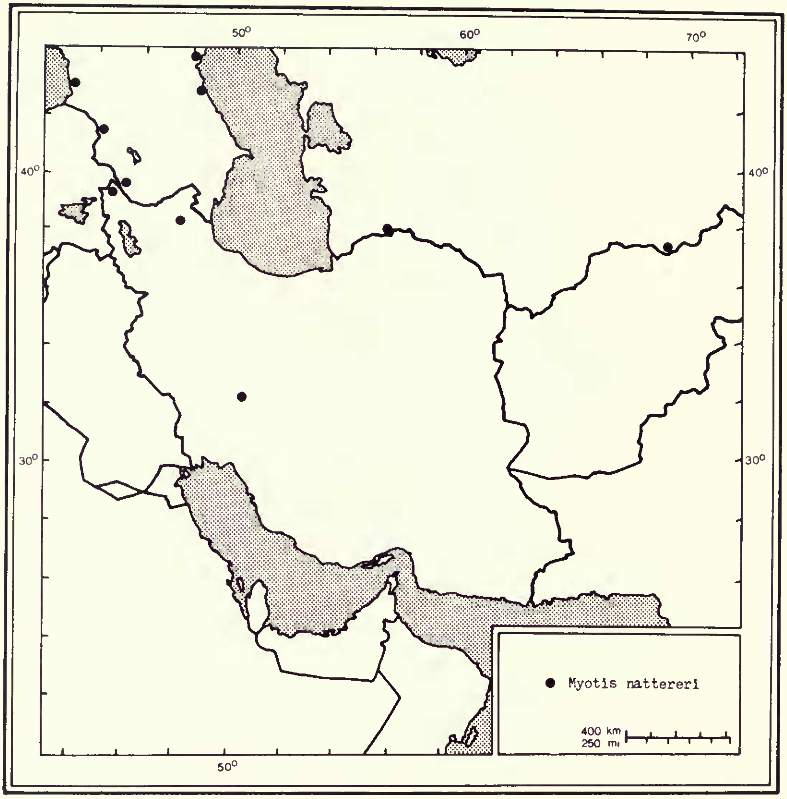

FIG. 102. Distribution of *Myotis nattereri*.

Bobrinskii et al. (1944, p. 83) observed that in the USSR *M. emarginatus* "has in all cases been found among colonies of females of the great horseshoe bat with which it has evidently a close biological connection," and Gaisler (pers. comm., 1976) said association of these two forms is very common in Europe. None of the previous Iranian records of *M. emarginatus* mentioned its association with other species; however, at Mar Ab Canyon I collected it along with *R. ferrumequinum*.

Myotis nattereri (Kuhl)

Vespertilio nattereri Kuhl, 1818, Ann. Wetterau Ges. Gesammte Naturk., 4, 1, p. 33.

Type Locality.—Hannau, Hessen, Germany.

General Range:

Morocco (Hayman and Hill, 1971, p. 35). Central Europe from Portugal to Poland and from southern Sweden to southern Italy (van den Brink, 1968, p. 57). Near the Soviet border in Turkey (Çağlar, 1965). Israel (Harrison, 1964, p. 134). Lebanon (Atallah, 1970). In the USSR several localities west of the Urals and in the Caucasus; and scattered localities along the southern frontier from Turkestan to Vladivostok (Bobrinskii et al., 1965, Map 18). Japan (Wallin, 1969, p. 279). Korea (Won, 1961, p. 51). Manchuria (Ellerman and Morrison-Scott, 1951, p. 143).

Iranian Distribution:

Harrison (1963, p. 302) reported two specimens from the Sulphur Caves at Guter Su (=Kutur Su), East Azarbaijan Province (BM 63.1194-5). The 1968 Street Expedition obtained one specimen at Maku, West Azarbaijan Province (FMNH 111606) and another 6 miles NW Kuh Rang, Chahar Mahal and Bakhtiari Province (FMNH 111235) (DeBlase 1971A). The above records and the distribution of this species in the USSR (fig. 102) indicate that it could be expected in the Zagros Mountains possibly as far south as Shiraz and through the Elburz Mountains at least as far east as the Kopet Dagh.

Subspecies:

Myotis nattereri araxenus Dahl

Myotis nattereri araxenus, Dahl, 1947, Dokl. Akad. Nauk. Arm. SSR, 7(4), pp. 173-178.

Type Locality.—Amagu, Azizbekovski region, Rr. Araxes Valley, Armenia.

Range.—Armenia and western Iran.

Harrison (1963, p. 302) has assigned the Kutur Su specimens to the form *M. n. araxenus* Dahl. This subspecies is larger than the nominate form and larger than *M. n. hoveli* from Israel. Measurements of the Maku and Kuh Rang specimens are within the range for *M. n. araxenus* (FA 42, 43; C-M^3 6.8, 6.7 mm.), even though both are immature by epiphysial ossification.

Specimens Examined:

In addition to the four Iranian specimens for which catalog numbers are given above, I have examined the holotype of *Myotis nattereri hoveli* Harrison, 1964 (BM 67.1228) from Israel.

Ecological Notes:

The Kutur Su specimens (one male, one of undetermined sex) were found on 21 August 1961 mummified along with several other species in a cave. They had apparently been overcome by sulphur fumes (Harrison, 1963, pp. 301-302).

The Maku specimen was found dead in a garden (DeBlase, 1971A, p. 11). This immature male was fresh when found and had obviously only recently died. The area in which it was discovered had several fairly large trees, numerous inhabited buildings, and a complex of ruins and tunnels cut into the face of the huge cliff overhanging the north side of the town. We examined the ruins and tunnels and questioned the inhabitants, but except for a long-dead *Rhinolophus blasii* no evidence was found of other bats.

The Kuh Rang specimen, a female young of the year, was shot on 25 September 1968 as it flew over our camp (fig. 4) (DeBlase, 1971A, p. 11). A few small caves in this area had been searched without result.

Ognev (1928, p. 337) said that in the USSR *M. nattereri* "lives in colonies in hollow trees but also lives in house attics." Bobrinskii et al. (1944, p. 82) mentioned finding a colony of three males and six females in a hollow walnut tree in northern Soviet Azerbaijan. Harrison (1964, p. 135) described a colony found on 30 April clustered on the ceiling of a dark dungeon beneath a ruined castle in Israel. All of the bats collected from this colony were females, a number of which were pregnant. Attics, hollow trees, and dark dungeons are rather different roosting sites, but all three would have been available at Maku. No hollow trees were present anywhere in the vicinity of the Kuh Rang collecting site, but attics and perhaps a large cave that we never learned of were available.

Ognev (1928, p. 337) said that in Caucasia *M. nattereri* is found to an altitude of 6,000 ft. The Kuh Rang specimen was shot at 8,500 ft. in the Zagros Mountains.

Myotis bechsteini (Kuhl)

Vespertilio bechsteinii Kuhl, 1818, Ann. Wetterau. Ges. Gesammte Naturk., 4, I, p. 30.

Type Locality.—Hanau, Hessen, Germany.

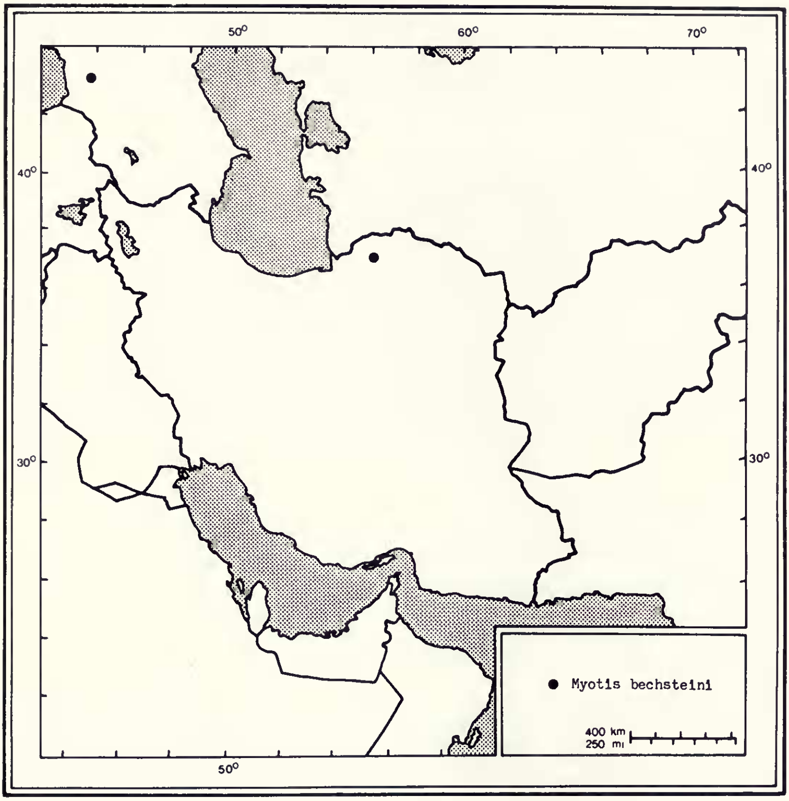

FIG. 103. Distribution of *Myotis bechsteini*.

General Range:

Central Europe and scattered areas over northern and southern Europe (van den Brink, 1968, p. 57). European USSR and NW Transcaucasia (Bobrinskii et al., 1965, Map 20).

Iranian Distribution:

The only Iranian specimen, reported here for the first time, was collected at the Mohammed Reza Shah National Park, Mazandaran Province, Iran (fig. 103). The only other central Asian records for this species are from the northwestern part of Transcaucasia. Thus the Iranian specimen is the easternmost record of *M. bechsteini* by approximately 1,400 km. *Myotis bechsteini* could be expected to occur throughout the Elburz Mountains and the northern Zagros.

Specimens Examined:

I have examined only the Mohammed Reza Shah National Park specimen (UMM 118504) listed above.

Ecological Notes:

The only Iranian specimen is an adult female collected in an old field (shooting or mistnet?) during June, 1969. There is no mention of reproductive activity on the specimen label.

Bobrinskii et al. (1944, p. 78) said that in the USSR during the summer *M. bechsteini* is occasionally found singly among colonies of hollow-tree-roosting species, particularly *M. daubentoni* and *M. nattereri*. Even less frequently small groups of only *M. bechsteini* are found in hollow trees. In the winter single individuals have been taken from caves, underground passages, and cellars.

Myotis blythi (Tomes)

Vespertilio blythi Tomes, 1857, Proc. Zool. Soc., London, p. 53.

Type Locality.—Nasiribad, Rajputana, India.

Holotype.—BM 48.8.18.6, skin and skull.

General Range:

Morocco, Algeria, and Tunisia (Hayman and Hill, 1971, p. 33). Mediterranean and south central Europe (van den Brink, 1968, p. 59). Turkey (Çağlar, 1965, p. 130). Iraq, Syria, Lebanon, and Israel (Harrison, 1964, p. 125). Southern USSR from Moldaviya to the headwaters of the Ob (Bobrinskii et al., 1965, Map 21). Afghanistan (Neuhauser, 1969). China, Rajputana, Punjab, and perhaps Kashmir (Ellerman and Morrison-Scott, 1951, p. 145).

Iranian Distribution:

Iranian records of *Myotis blythi* are listed in Table 16 and mapped in Figure 104. This species has been found throughout western and northern Iran and from one locality in northeast Iran. Records from Boulon Cave, near Qalat, Afghanistan, indicate that it may occur in southeastern Iran as well.

Subspecies:

Myotis blythi omari Thomas

Myotis myotis omari Thomas, 1906, Proc. Zool. Soc., London, **1905**, 2, p. 521.

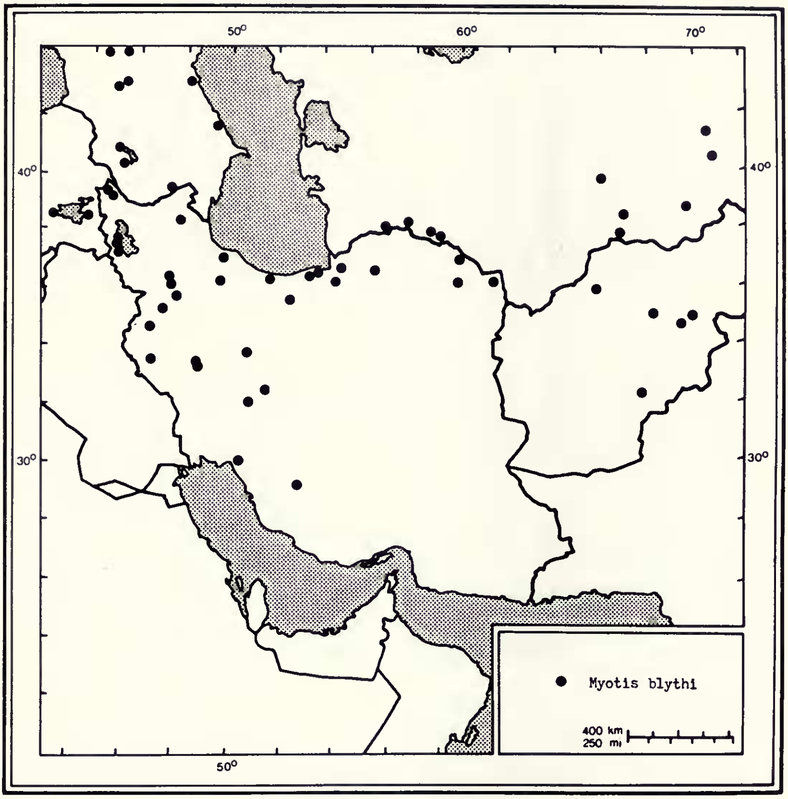

FIG. 104. Distribution of *Myotis blythi.*

Type Locality.—Derbent (=Darband), 50 miles west Isfahan, 6,500 ft., Iran.

Holotype.—British Museum skin and skull BM 5.10.4.14, a male collected on 14 May 1905 by R. B. Woosnam.

Range.—Southwest Asia from Anatolia and Israel east to NW India and north to southern Soviet central Asia.

Thomas (1905, p. 521) described "*Myotis myotis omari* subsp. n." from three specimens from Derbent (=Darband), 50 miles W of Isfahan, Iran, and included the specimen from near Telespid in his new form. Cheesman (1921, p. 576) described "*Myotis myotis risorius* Subsp. nov." from four specimens from Shiraz, Iran. Misonne (1959,

TABLE 16. Records of *Myotis blythi* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Dobson (1871, p. 461)	Shiraz	FAS	—	—	—	—	
Thomas (1905, p. 521)	Derbent (= Darband), 50 miles W Isfahan	ESN	2	2♂	14 May 1905	BM 5.10.4.14-15	Includes holotype of *M. m. omari*. "Shot from trees near the village." Both adults.
	nr. Telespid	KHU	1	1♂	13 June 1902	BM 2.10.1.5	
Thomas (1907, p. 197)	Elburz Mts. *nr.* Resht (= Rasht)	GIL	2	1♂ 1♀	15 May 1907	BM 7.7.14.5-6	"Frequenting the post houses."
Cheesman (1921, p. 576)	Shiraz	FAS	4	2♂ 1♀	22 June 1919	BM 20.2.9.18-19	Includes holotype of *M. m. risorius*.
Kuzyakin (1950, p. 246)	?	MAZ	—	—	—	—	Dot on map.
	?	MAZ	—	—	—	—	Dot on map.
	?	MAZ	—	—	—	—	Dot on map.
	?	MAZ	—	—	—	—	Dot on map.
Coon (1952, p. 244)	Hotu Cave *nr.* Behshahr	MAZ	1	—	—	—	Single jaw found during archaeological dig.
Harrison and Lewis (1961, p. 377)	Shiraz	FAS	5	2♂ 3♀	14 to 16 June 1920	BM 25.10.4.5-9	"Caught in a flour mill 2 miles from Shiraz."
Harrison (1963, p. 301)	Guter-Su (= Kutur Su)	EAZ	1	1♂	21 Aug. 1961	BM 63.1193	Adult found mummified in Sulphur Cave, N side of Mt. Sabalan along with mummies of several other species.
Aberdeen Univ. (1965)	Jangeh, 25 miles from Kuh Rang on Shahkord Road	CMB	12	10♂ 2♀	1965	BM 66.3215-26	
Etemad (1967, p. 277-8)	Rood Afshan Caves, 105 km. E Tehran	CEN	6	4♀ 2 ?	3 May 1963	HZM 12.3743-17.3748	

Table 16. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Lay (1967, pp. 93, 141)	4 km. W Maku	WAZ	1	1♀	29 Sept. 1962	FMNH 96685	Roosted alone in dry shallow cave. Adult.
	22 km. SW Rezaiyeh	WAZ	1	1♀	14 Sept. 1962	FMNH 96720	Roosted alone in a shallow man-made cave. Adult. See Ecological Notes section.
Etemad (1969, p. E10)	Azad Khan Cave, Mahalat (=Mahallat)	CEN	1	1♀	Fall, 1963	—	
Farhang-Azad (1969, p. 371)	Chelmir	KHR	4	2♂ 2♀	July, 1968	IPHR 2 uncat.	Mistnetted over stream. Females fat, no embryos.
Farhang-Azad (1970)	Chelmir	KHR	1	—	July, 1969	—	
	20 km. W Meshad (=Mashhad)	KHR	11	1♂ 1 ?	22 July 1969	IPHR 830, 834	
	71 km. E Meshad (=Mashhad)	KHR	11	—	29-30 July 1969	—	
	20 km. S Rezaiyeh	WAZ	9	—	—	—	
Farhang-Azad (1971)	4 km. W Abhar	ZAN	9	—	—	—	
	20 km. S Rezaiyeh	WAZ	13	—	—	—	
DeBlase (1971B, p. 39)	Cara Tarik (=Gara Tarik) about 20 miles N Divandarreh near village of Qareh	KOR	292	77♂ 215♀	13, 14 Aug. 1968	FMNH 111333-45; 111367-78	See "Ecological Notes" section.
	Karaftu, about 32 miles N Divandarreh near village of Dashbologh	KOR	7	5♂ 2♀	16 Aug. 1968	FMNH 111346-52	See "Ecological Notes" section.
	River Cave (=Korie Cowat), about 15 miles NW Ravansar	KRS	26	16♂ 10♀	23 Aug. 1968	FMNH 111251-76	See "Ecological Notes" section.
	Porcupine Cave, 20.6 miles SE Ilam	ILA	29	15♂ 14♀	28 Aug. 1968	FMNH 111277-97	

Table 16. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Felten (in press)	Mozduran	KHR	1	1 ?	4 Oct. 1975	—	Juvenile. SMF 46689 (Felten, pers. comm., 1975).
New Records	Zangamar River Cave at Maku	WAZ	1	1♀	28 July 1968	FMNH 111306	Adult mistnetted at cave entrance at 10:50 p.m. One *M. blythi* seen but not collected in same cave on 25 July during day.
	33 km. SSE Rezaiyeh	WAZ	16	16♂	1 Aug. 1968	FMNH 111307-22	Man-made cave. See "Ecological Notes" section.
	16 km. NNW Rezaiyeh	WAZ	1	1♂	4 Aug. 1968	FMNH 111247	Found in small solution hole in ceiling of small wet cave. Adult.
	Sanandaj	KOR	18	12♂ 2♀ 4 ?	12 Aug. 1968	FMNH 111248-50; 111323-32	From small domes in dark room in large mosque. See "Ecological Notes" section.
	Eshkaf Dareze Cave, W edge of Khurramabad	LOR	1	1 ?	6 Sept. 1968	FMNH 111298-300	Mummy of prevolant bat.
	3.2 km. NW Khurramabad	LOR	16	16♂	6 and 13 Sept. 1968	FMNH 111301-5; 111356-66	Cave. See "Ecological Notes" section.
	36 km. NE Bijar	KOR	3	3♂	20 Sept. 1969	UMM 117564-6	Cave. Collected by D. M. Lay.
	Shiraz	FAS	2	1♂ 1♀	15 and 16 June 1920	FMNH 82723	Additional specimens from series reported by Harrison and Lewis (1961).
	37 km. E Chalus	MAZ	1	1♀	6 Aug. 1970	BM 71.1665	Sisangon Forest Park. Mist-netted over scrub on sand dunes.

p. 25) listed these two forms and cited the specimen from the vicinity of Resht (=Rasht) as *M. m. myotis*.

Miller (1912, p. 202) showed that *M. oxygnathus* Monticelli, 1885, is distinct from *M. myotis*. Ellerman and Morrison-Scott (1951, p. 145) considered *oxygnathus* conspecific with *M. blythi* Tomes, 1857. This arrangement has also been followed by many recent authors (Aellen, 1959; Harrison and Lewis, 1961; Bobrinskii et al., 1965; Topal, 1971; Strelkov, 1972). Harrison and Lewis (1961, p. 379) have established that *omari* and *risorius* are representatives of *M. blythi* rather than *M. myotis*.

Thomas (1905, p. 522) described *omari* as having "General colour above uniform pale 'wood brown,' the basal halves of the hairs smoky brown, succeeded by a broad ring of glossy whitish sandy and a fine pale brown point. Under surface broadly washed with 'cream buff.'" Cheesman (1921, p. 576) described the color of *risorius* as follows:

> Much resembles, but is paler than *M. m. omari*, Thomas. Also differs from *M. m. omari* in the absence of the general washing of cream buff on the back, underparts, and wing filaments, which on the back of *M. m. risorius* is replaced by a pale purplish washing ... General colour above "drab grey," slightly darker toward the tail ... Below ... tips of hairs white ... Limbs and wing filaments "drab."

I have examined 169 *M. blythi* from Iran. While all are "light," there is considerable variation in hue including both Thomas's "wood brown" and Cheesman's "drab grey." Specimen FMNH 111249, an adult female from Sanandaj, is the lightest specimen and has an overall dorsal coloration closest to Vinaceous-Buff (Ridgway, 1912, pl. XL). Specimen FMNH 96720, an adult male from 22 km. SE Rezaiyeh, is the reddest; it is slightly redder than Avellaneous but not as red as Vinaceous-Fawn (Ridgway, 1912, pl. XL). Specimen FMNH 111252, an adult female from Korie Cowat, is the darkest brown; it is closest to Buffy Brown (Ridgway, 1912, pl. XL). Specimen FMNH 111306, an adult female from Maku, is the grayest; it matches Light Drab (Ridgway, 1912, pl. XLVI). Specimens FMNH 82723-24 (adult female and male) topotypes of *risorius* from Shiraz match Avellaneous (Ridgway, 1912, pl. XL). None of the Street Expedition specimens has a ventrum that is "broadly washed with 'cream buff'" (Thomas, 1905). Most have all ventral hairs tipped with white.

Cheesman (1921, p. 576) also said that forearm measurements of *risorius* "are on the average slightly longer than those of ... *omari*." The six Shiraz specimens in the British Museum and the one in Field Museum have the forearm length ranging from 54.5 to 63.8 mm. and averaging 61.1 mm. Forearms of bats from 15 other locations in Iran range from 56 to 68 mm.; the means of these 15 samples range from 58.7 to 65.1 mm.

It is thus clear that *risorius* must be placed in synonymy with *M. blythi omari*, an arrangement followed by several authors (e.g., Topal, 1971; Strelkov, 1972). Aellen (1959) indicated his belief that *M. b. omari* is synonymous with *M. b. blythi*. However, both Topal (1971) and Strelkov (1972) concluded that the two are distinct and that each is distinct from *M. b. oxygnathus* at the subspecies level. All *Myotis blythi* from Iran are thus referable to *M. b. omari*.

Specimens Examined:

In addition to the Iranian specimens of *Myotis blythi* for which catalog numbers are listed in Table 16, I have examined one from Lebanon (FMNH 99561), 10 from Afghanistan (FMNH 102495-8, 102490-4, BM 47.356) and one from India (BM 48.8.18.6, the holotype of *V. blythi* Tomes, 1857). I have also examined specimens of *Myotis myotis* from Lebanon and Germany.

Ecological Notes:

On the afternoon of 25 July 1968 I observed a *M. blythi* in a deep tight hole in the ceiling near the entrance of a small cave, near the Zangamar River at the east edge of Maku. On the evening of 28 July I mistnetted the entrance of this cave and collected an adult female *M. blythi* as it attempted to fly out at 10:50 P.M. Lay (1967) had collected in this cave on 2 and 6 October 1972 and had found *Miniopterus* and two species of *Rhinolophus*, but no *M. blythi*.

On 1 August 1968 I visited the man-made cave which was 22 km. SE Rezaiyeh and from which Lay (1967) collected one adult male on 14 September 1962. I found it inhabited by 20 *M. blythi*. These bats were alert and flew readily when we entered the room. All 16 collected are adult males.

On 12 August 1968 in Sanandaj I collected 15 of the 17 to 20 *M. blythi* found hanging in several, small, brick domes of a dark, unused storeroom in the mosque. The 12 males, two females and one of undetermined sex, hung singly or in groups of two to three in the crevices between bricks but flew readily when we approached them.

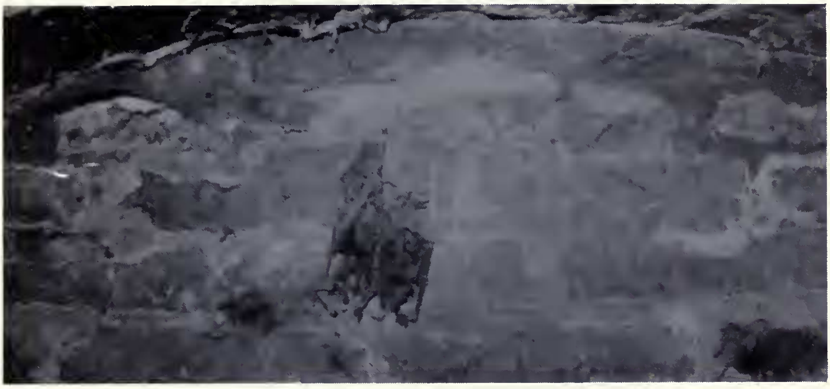

FIG. 105. Skeletons of three *Myotis blythi* hanging where found on the wall of a small, dark room in the mosque in Sanandaj.

In another small room of this mosque I found three skeletons of *M. blythi* hanging on a side wall. These three hung in close contact in a normal roosting position (fig. 105). They had obviously been killed simultaneously, but by what I do not know.

On 13 and 14 August a sample of 292 was collected from the estimated 12,000 *M. blythi* inhabiting Gara Tarik. This sample included 215 females and 77 males. If we assume a litter size of one, this ratio of about three to one is what would be expected in a nursery colony containing only females and young. Most of these bats hung with *Miniopterus schreibersi* and *R. mehelyi* in large clusters that carpeted areas of the cave ceiling. However, numerous *M. blythi* hung singly or in pairs (fig. 106). I have described this pairing behavior elsewhere (DeBlase, 1971B, p. 39). All of the *M. blythi* appeared to be in deep torpor. One individual plucked from its roost and allowed to lie in my open gloved hand took five minutes to become alert enough to fly away.

On 16 August we collected five male and two female *M. blythi* from the approximately 30 of the species while they hung singly or in pairs in the large, dark, wet cavern area of Karaftu, an abandoned cliff dwelling and cavern complex. All *M. blythi* observed appeared to be in deep torpor. Many guano piles, ranging in size from huge (approximately 4 m. in diameter and 1.5 m. high at the apex) to minute, were found under domes in this cavern. Similar guano piles had been observed under the large clusters in Gara Tarik, but no large clusters of bats were present at Karaftu, where

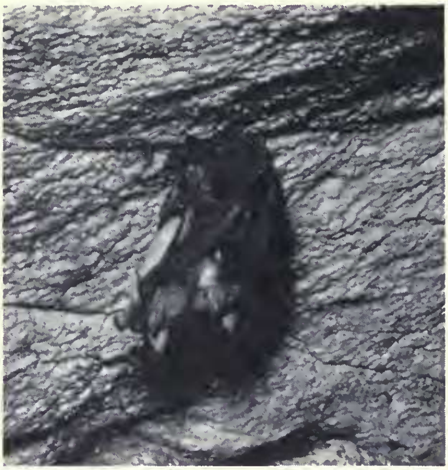

FIG. 106. A pair of torpid *Myotis blythi* hanging in Gara Tarik.

only the 30 *M. blythi* and approximately 30 *M. schreibersi* were observed.

On 23 August we visited a large cave named Korie Cowat, about 24 km. NW Ravansar, that has a large, fast stream nearly filling the bottom of the cave. We observed approximately 5,000 *M. blythi* and 3,000 *M. schreibersi*. Most of these bats hung in dense curtains over portions of the stream that were too deep to allow us to approach. Sixteen male and 10 female *M. blythi* were collected from the approximately 1,000 individuals that hung singly or in pairs in accessible areas. All bats appeared to be in deep torpor.

On 28 August we found 29 *M. blythi* in a small, damp cave about 32 km. E Ilam. This population included 15 males and 14 females. The extra male hung above the others, which all hung in bisexual pairs. All bats appeared to be in torpor and no other species were seen. A scattering of guano carpeted the floor but no large piles were seen.

On 6 September I found one mummified *M. blythi* in the guano on the floor of Eshkaf Dareze, a large but shallow cave in the mountainside at the northwest edge of Khurramabad. Mummies of four immature *R. mehelyi* were also found. However, only one live bat, *R. ferrumequinum*(?), was seen but not collected.

On 6 and 13 September *M. blythi* were collected from a large cave located about 3.2 km. NW Khurramabad in the same mountain mentioned above. The 16 males were collected from approximately 50 that hung singly in a low side tunnel. The cave's main chamber is a large room, most of which was in the twilight zone. On the ceiling, about 100 ft. above the cave floor, were two large clusters of several hundred *M. blythi* each. On the higher portions of the walls and lower portions of the domed ceiling, individual *M. blythi* hung on spaced patches of crystallized urine similar to those from Dehloran, as described in the Ecological Notes section under *Asellia tridens*. A sample of about 20 of the lowest of these yielded only males. We were unable to reach the large clusters to determine if females were present in these. All *M. blythi* appeared to be in torpor, but about 12 *R. ferrumequinum* also inhabiting the cave were very active.

Miscellaneous ecological data for *M. blythi* in Iran is summarized in Table 16. The species has apparently never been collected in Iran between early October and the first of May. During these winter months both Lay and I were collecting in the southern part of Iran, where this species probably does not occur. Several of the spring records are from buildings or trees, with neither sex seeming to dominate. The caves and mosque from which I collected on 1, 4, and 12 August and Lay collected on 14 and 24 September appear to be bachelor colonies used exclusively or primarily by males. These are probably not used as hibernacula, since only one specimen was present at 22 km. SE Rezaiyeh on 14 September and none was present at Maku on 2 and 6 October. The sex ratio and amount of guano at Gara Tarik indicate that this cave is a nursery site. Korie Cowat, visited on 23 August, is probably also a nursery and may be used as a hibernaculum as well. From the amount of guano at Karaftu on 16 August it appears as though there is also a nursery, but, if it is, most of the bats had already left for hibernacula by 16 August. The cave visited on 28 August may be a hibernaculum or merely a transient rest stop. The small quantity of guano in this cave rules out its use as a nursery. The Khurramabad cave visited on 6 September is probably a nursery site, as shown by the large amount of guano and the mummified bats. The nearby cave visited on 6 and 13 September probably serves as a hibernaculum and may double as a nursery.

The evidence from Gara Tarik and the numerous more northerly all-male roosts strongly indicates that in Iran the sexes of *M. blythi* segregate during the breeding season. Adult males select summer roosts in twilight areas of small, relatively dry caves and cave-like buildings, whereas nursery colonies of females utilize large, relatively damp caves. However, Ognev (1928, p. 333) reported what seemed to be nursery colonies in buildings and quoted an observer "(Formozov, 1926)" who said that the males and females stayed together during the entire summer. Bobrinskii et al. (1944, p. 78) also said that "the colonies do not break up in the summer. Solitary individuals occur comparatively rarely. The males usually live with the females all the year round." Gaisler (pers. comm., 1976) said that nursery colonies of about 90 per cent females are common in Europe.

Ognev (1928, p. 332) mentioned large colonies of *M. blythi* and *Miniopterus schreibersi* living together in "caves [or ruins?]" in the Crimea and in a cave in the Transcaspian region. These two species have been found together at four large caves in Iran: Gara Tarik, Karaftu, Korie Cowat, and Mozduran.

Myotis capaccinii (Bonaparte)

Vespertilio capaccinii Bonaparte, 1837, Fauna Ital. I, fasc. 20.

Type Locality.—Sicily.

General Range:

Morocco and Algeria (Hayman and Hill, 1971, p. 33). Mediterranean region of Europe (van den Brink, 1968, p. 53). Turkey (Çağlar, 1965). Iraq and Israel (Harrison, 1964, p. 130). Lebanon (Atallah, 1970). USSR on the Amu-Daria River south of the Aral Sea and the vicinity of Vladivostok (Bobrinskii et al., 1965, Map 22). Japan, Korea, and China (Wallin, 1969).

Iranian Distribution:

Etemad (1963, p. 309) reported a specimen from Fars Province. According to Lay (1967, p. 141) Etemad's specimen was collected by the 1962 Street Expedition along with the 36 specimens that Lay reported from 5 km. SE Pol-i-Abgineh, and Etemad (1969E, p. 12) has confirmed this. I have re-examined Lay's series and have identified as *Miniopterus schreibersi* six of the 19 specimens in alcohol that he reported as *M. capaccinii*. This leaves 30 *M. capaccinii* from Pol-i-Abgineh in Field Museum collections (FMNH 96686-700; 96702; 96704; 96706; 96708-12; 96714-7; 96719; 98393-4).

DeBlase (1971A) reported specimens collected by the 1968 Street Expedition at Persepolis (FMNH 111240-2) on 3 October, from

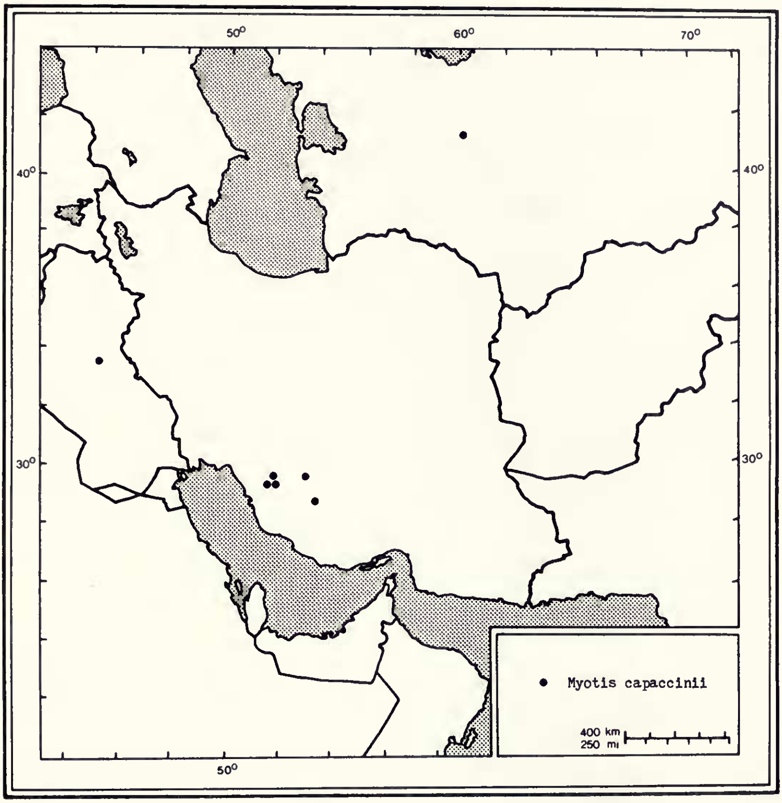

FIG. 107. Distribution of *Myotis capaccinii.*

Shahpur Cave (FMNH 111243-5) on 9 October, and from Canae Gabru Cave, near the village of Tar Divon (=Tadovan) about 65 km. N Jahrom (FMNH 111246) on 10 November. Two specimens (USNM 350146-7) were collected 10 km. SE Kazerun. All of these localities are in Fars Province.

Myotis capaccinii is known in Iran only from the above five localities, all of which are within a radius of 100 km. of Shiraz, Fars Province (fig. 107). This species has been found only in a few widely scattered areas of Asia, but the large number of individuals found by Harrison (1964, p. 131) at Carmel Caves in Israel and the frequent occurrence of the species in the Shiraz area indicate that in these scattered pockets it is not uncommon. It may exist in other parts of Iran as well.

Subspecies:

Myotis capaccinii bureschi (Heinrich)

Leucone capaccinii bureschi Heinrich, 1936, Mitt. Naturwiss. Inst. Sofia, **9**, p. 38.

Type Locality.—Karamlek, Strandjabalkan, 800 ft., Bulgaria.

Holotype.—Zoological Museum, Berlin, No. 312, a male collected 2 July 1935.

Range.—From Bulgaria southeast to Israel, Iraq, and SW Iran.

Harrison (1964, p. 130) referred *M. capaccinii* from Israel to the form *M. c. bureschi* Heinrich, 1936, on the basis of their belly being whiter and back paler than those of the nominate race. The Iranian specimens agree with Harrison's external and cranial measurements and color description of the Israeli specimens. It is therefore probable that they should also be included as *M. c. bureschi*.

Specimens Examined:

I have examined all Iranian specimens for which catalog numbers are listed above.

Ecological Notes:

Myotis capaccinii apparently occupies caves and man-made, cave-like structures year round. Lay (1967, p. 61) observed about 30 individuals in a large room in Shahpur Cave on 29 December 1962. In his field journal Lay (pers. comm., February, 1974) said that "A few individuals were observed hanging solitarily at the entrance to that hot (very, very hot and humid) upper chamber ... on close examination of the source of a chattering noise, I found two colonies packed into holes in the ceiling with very small openings. Exactly how many bats occupied each hole I didn't ascertain, yet one shot killed four and I saw others still inside. These bats were very active and flew at the slightest provocation." While Lay here mentioned shooting four of these bats, no such specimens exist in the Field Museum collections, nor are they listed in Lay's field catalog. When I visited the same cavern room on 9 October 1968, it was inhabited by 30 to 40 *Miniopterus schreibersi*, two *R. ferrumequinum* and only two male and one female *M. capaccinii*. The *Myotis* hung individually, in torpor, and well separated from the other species.

According to Lay's field catalog three of the male *M. capaccinii* from 5 km. SE Pol-i-Abgineh were removed "from small dim cave in a small hole in ceiling" on 28 December. The remaining specimens from this locality were received on 27 December when "a boy brought a net of nearly 50 specimens that he said he took from their roost in a well" (Lay, field journal, pers. comm., February, 1974). This well "consisted of a shaft approximately 4 ft. in diameter with a water table at a depth not more than 20 ft. below ground surface. At ground level rocks had been piled up to form a rim around the opening. The top opening was loosely covered with sticks." The series from this well is interesting as it includes 23 males, two females, and one of undetermined sex. It is apparent that sexes were segregated, with females either occupying a portion of the well not sampled or occupying a completely different roost site.

On 10 November 1968 I found one male *M. capaccinii* in torpor hanging from a small dome in Canae Gabru. A few *R. blasii* and *R. euryale* also in torpor shared this dome, but the *Myotis* hung singly several feet away from them. *Rhinolophus hipposideros* and two species of *Rhinopoma* were found elsewhere in this large and complex cave, but no other *M. capaccinii* were found.

On 3 October 1968 one male and two female *M. capaccinii* were shot as they flew low over a small pool in a garden adjacent to the ruins of Persepolis. The specimens from 10 km. SE Kazerun are both males collected on 20 November 1963.

On 18 April 1962 Harrison (1964, pp. 130-131) observed a large colony of *M. capaccinii* in the Carmel Caves in Israel. He said that every female examined contained a single fetus. While he does not give a sex ratio for this colony, no males are mentioned and he lists measurements only for females. This together with the Pol-i-Abgineh record indicates that sexual segregation may occur in this species at certain seasons of the year.

Vespertilio murinus Linnaeus

Vespertilio murinus Linnaeus, 1758, Systema Nat., 10th ed., I, p. 32.

Type Locality.—Sweden.

General Range:

Eastern Europe west to France; scattered records west to Britain and north to northern Sweden (van den Brink, 1968, p. 67). USSR from Europe to the Pacific south of 60°N latitude (Bobrinskii et al., 1965, Map 34). Afghanistan (Neuhauser and DeBlase, 1974). Japan, Mongolia, Kashmir, and Chinese Turkestan (Ellerman and Morrison-Scott, 1951, p. 152). Wallin (1969, p. 308) said that the species does not occur in Japan, did not include Kashmir on his map, and questioned the record from Chinese Turkestan.

Iranian Distribution:

Misonne (1959, p. 25) cited "*Vespertilio murinus murinus* Linne, 1758 (*Serotine bicolor*). *A Shiraz* (Blanford, 1876)." However, Blanford (1876, p. 20) reported a specimen of "*Vespertilio murinus* Schreb." from Shiraz and not *V. murinus* Linnaeus. Ellerman and Morrison-Scott (1951, p. 144) listed *Vespertilio murinus* Schreber as a synonym of *Myotis myotis* Borkhausen. As discussed above, the large *Myotis* from Iran are all referable to *Myotis blythi*. Thus the specimen cited by Blanford and by Misonne is probably *M. blythi* Tomes.

Lay (1967, p. 146) cited "Etemad (1964, p. 653) ... two specimens from Isfahan [Province], Mahallat." The 1964 paper by Etemad contains no reference to *V. murinus*, and Etemad (1969E, p. 12) said that he had never reported this species from Iran. Lay (1967, p. 146) also reported a male *V. murinus* Linne. collected by the 1962 Street Expedition near Dasht, Mazandaran Province (FMNH 96764). This is the first authentic record of this species from Iran. The 1968 Street Expedition collected a female *V. murinus* Linne. at the village of Sar Dasht, SW Lordegan, Chahar Mahal and Bakhtiari Province on 1 October (FMNH 111499) (DeBlase, 1971A). A specimen from 28 km. S Qum (=Qom), Central Province, is in the Iran Public Health Research collections (uncataloged).

Vespertilio murinus is known in Iran only from one site in the Elburz Mountains, one in the Zagros Mountains, and one in the central basin between these two (fig. 108). It is not unlikely that it occurs throughout these two mountain ranges, and the Qom specimen indicates that it may range over the basin areas as well.

Subspecies:

Vespertilio murinus murinus Linnaeus (see above)

Only the nominate subspecies occurs in Iran. Wallin (1969) restricted the range of this subspecies to the range of the species west of Mongolia.

Specimens Examined:

In addition to the three specimens listed above, I have examined one from Afghanistan (FMNH 102764) and one from the USSR (BM 62.694).

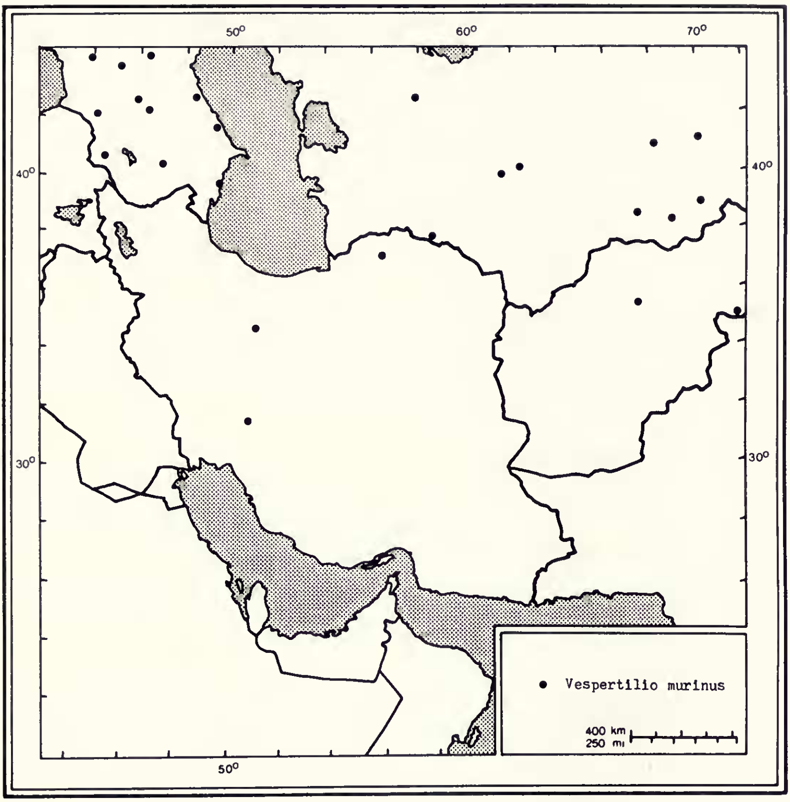

FIG. 108. Distribution of *Vespertilio murinus.*

Ecological Notes:

The Dasht specimen (Lay, 1967, p. 146) is an adult male collected in the attic of a house on 3 November 1962. It was kept alive for three weeks, during which time it remained torpid, hanging from the top of its cage. When handled, it made slow uncoordinated movements and never attempted to fly. This bat contained large quantities of fat.

The Sar Dasht specimen is an adult female shot at dusk on the evening of 1 October 1968 as it flew over a wide jube and around an electric light. The Qom specimen is a male mistnetted over a stream on 24 April 1969.

Bobrinskii et al. (1944, p. 202) observed that in summer *V. murinus* in the USSR "lives in attics of houses, behind wainscoating, in hollow trees, behind loose bark, etc." The rare males live apart from the females and form colonies, usually of a few dozen individuals. The females bear two young ones. Nothing is known of the species' hibernation. Van den Brink (1968, p. 70) said that in Europe it winters in trees and rock cavities and in cellars of buildings. Considering the date of collection, the behavior exhibited in captivity, and the amount of fat, I think it is possible the Dasht specimen would have spent the winter in the attic where it was collected.

Vespertilio murinus has been widely collected just across the border in the USSR but is one of the rarest bats in Iran. The Sar Dasht record at about 31° 31′ N is one of the southernmost records for this species anywhere in the world.

Eptesicus nasutus (Dobson)

Vesperugo (Vesperus) nasutus Dobson, 1877, Jour. Asiat. Soc. Bengal, **46**, 2, p. 311.

Type Locality.—Shikarpur, Sind, Pakistan.

Type Specimen.—"In the Indian Museum, Calcutta" (Dobson, 1878, p. 200).

General Range:

Aden, Saudi Arabia, Iraq, and Oman (Harrison 1964, p. 148; 1972, p. 627). Iran and Afghanistan (Gaisler, 1970, p. 24). Pakistan (Roberts, 1977, p. 66).

Iranian Distribution:

Thomas (1905, p. 520) reported this species from Ahwaz (=Ahvaz), Karun River, Khuzistan Province (BM 5.10.4.2 = 6). The 1968 Street Expedition collected this species at Meshrageh on the Jahari River about 85 km. S Ahvaz, Khuzistan Province (FMNH 111383-392), and at the Dozdan River at Minab (FMNH 111393), Persian Gulf and Sea of Oman Coastal Province (DeBlase, 1971A). Etemad (1973, p. 111) reported two specimens from 6 km. N Bandar Mahshahr (=Bandar-e Mashur), Khuzistan Province, as *E. walli*. I regard *E. walli* to be a synonym of *E. nasutus*. Harrison (pers. comm., March, 1975) has informed me of a specimen of undetermined sex from Choga Zambil (Ziggurat), near Shush Khuzistan Province, in the HZM collections.

Considering this bat's distribution in Arabia, Afghanistan, and Pakistan, I think it is likely that it occurs along the entire low

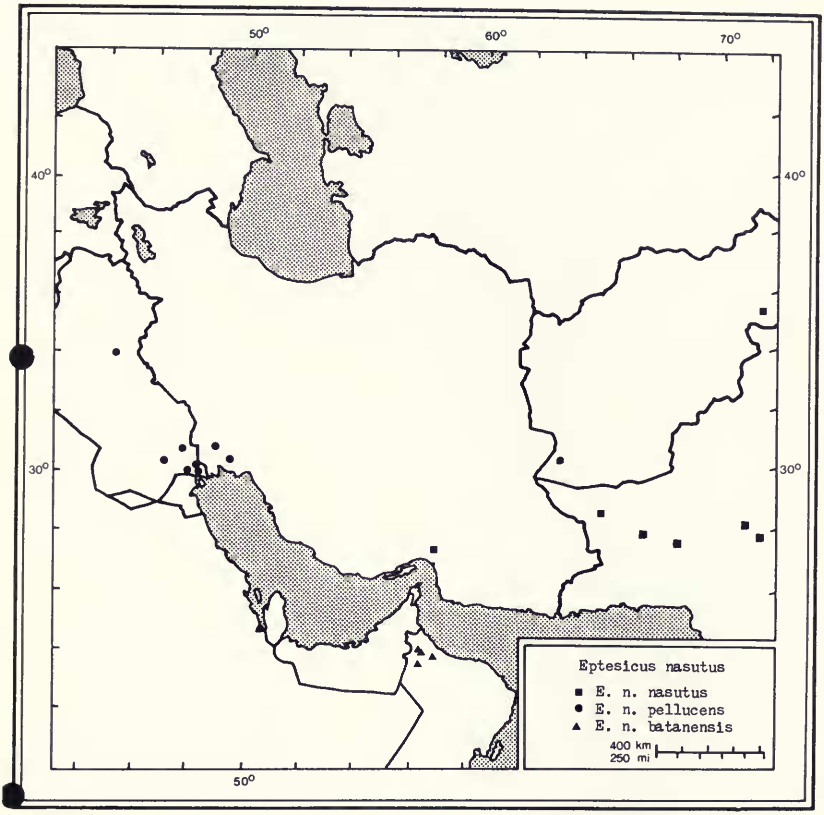

FIG. 109. Distribution of *Eptesicus nasutus*.

coastal area of southern Iran (fig. 109) and may be found in the more arid southern mountainous areas as well.

Taxonomic Remarks:

Thomas (1919, p. 746) described *Eptesicus walli* as a species closely "allied to *E. pellucens* and *matschiei*." He differentiated it from these forms, now regarded as subspecies of *E. nasutus*, on the basis of its larger size and the presence of "warts" on its wing and interfemoral membranes. In all other respects he found it very similar to *E. n. pellucens*.

Harrison (1964, p. 138) distinguished *E. walli* from *E. nasutus* on the basis of size and the presence of these warts. Gaisler (1970, p. 25) reported that live *E. nasutus* from Afghanistan possessed "minute tubercles on their wing membranes close to body, limbs and tail," and he reported that the parasitologist on their expedition had found that these tubercles contained larval stages of nematodes. I found numerous similar warts on the wing and interfemoral membranes of *E. nasutus* from Meshrageh in Iran.

The reason the warts have been conspicuously reported for *E. walli*, but not previously mentioned for *E. nasutus*, is probably due to the method of preparation of the specimens involved. The holotype of *E. walli* and the nine specimens from Nasiriya, Iraq, are all preserved in spirit, whereas all *E. nasutus* material in the British Museum is preserved as dry skins. Gaisler (1970, p. 25) mentioned that the tubercles of *E. nasutus* were conspicuous in live specimens and I also found them so. However, when my specimens were prepared, the warts disappeared as the skins dried, leaving only dots on the flat membrane (fig. 98). On specimens preserved in spirit the warts remained conspicuous.

The warts can thus be eliminated as a characteristic distinguishing *E. walli* from *E. nasutus*, leaving only the larger size of *E. walli* as a diagnostic feature. In both *E. walli* and *E. nasutus* the males are considerably smaller than the females (fig. 110). It is thus important to note that the holotype of *E. walli* and seven of the nine specimens from Nasiriya are females, whereas one of the two *E. n. pellucens* from Zubier, Iraq, and all five of those from Ahvaz, Iran, are males. This marked difference between the sexual composition of the *E. walli* and *E. n. pellucens* samples available to previous investigators has resulted in an undue emphasis on the relative sizes of these two forms.

When measurements for the six male and four female specimens from Meshrageh, those given by Etemad (1973, p. 111) for the two specimens from 6 km. N Bandar-e Mashur, and those given by Nader (1971, pp. 645-46) for one specimen each from Qalat Salih and Ali Miqdadiya, Iraq, are considered, overlap in size is demonstrated for *E. nasutus* and *E. walli*.

I have examined nine *E. walli* and two *E. n. pellucens* from Iraq and 15 *E. n. pellucens* from Iran. Although all of the *E. walli* are preserved in spirit and all of the *E. nasutus* are preserved as dry skins, I can find no difference in external coloration or morphology. The shapes of the ears, muzzles, feet, wings, and tails of the two forms are identical. Similarly, both groups are essentially identical in coloration to the description of *E. n. pellucens* given by Thomas (1905, p. 520). I can find no differences between the two forms in

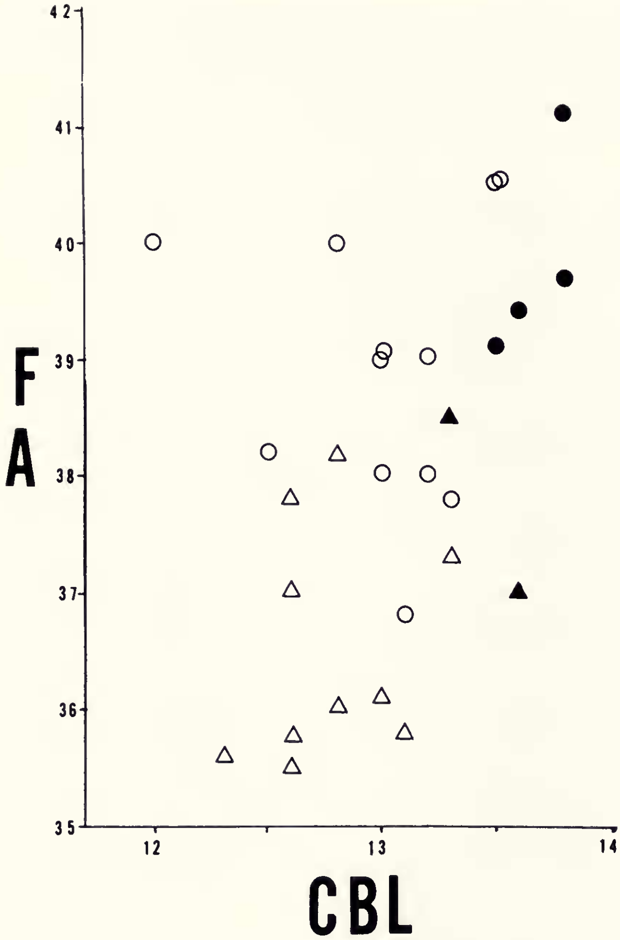

FIG. 110. Scatter diagram showing length of forearm (FA) versus condylobasal length of the skull (CBL) for male (triangles) and female (circles) *Eptesicus nasutus*. Solid figures were previously identified as *E. walli*. Sexual dimorphism is evident.

cranial or dental morphology, but those originally identified as *E. walli* do average larger than *E. n. pellucens* in cranial dimensions.

I can find no difference between *E. walli* and *E. n. pellucens* that justifies the specific status of *E. walli*, and I seriously doubt that the larger average size of those specimens originally identified as *E. walli* warrants even subspecific recognition.

Subspecies:

Eptesicus nasutus nasutus (Dobson) (see above)

Eptesicus nasutus pellucens (Thomas)

Vespertilio matschiei pellucens Thomas, 1906, Proc. Zool. Soc., London, **1905**(2), p. 520.

Type Locality.—Ahwaz (=Ahvaz), Karun River, 220 ft., South Western Persia.

Holotype.—An adult male skin and skull, BM 5.10.4.4, collected on 28 March 1905 by R. B. Woosnam.

Range.—The Tigris-Euphrates lowlands of Iraq and southwestern Iran.

Four subspecies of *E. nasutus* are presently recognized. The form *matschiei* was described by Thomas (1905, p. 573) from Aden and is known from only two specimens. It is the smallest *E. nasutus* (FA 33.1, 35.4 mm.; CBL 11.1, 11.2 mm.) and has dark, opaque wing and interfemoral membranes. The form *batinensis* was described by Harrison (1968, p. 321) from Oman and is known from only nine specimens. It is a medium-sized *E. nasutus* (FA 33 to 36.7 mm.; CBL 11.6 to 12.9 mm.) and has lighter, translucent membranes. The nominate form was described from Pakistan and is known only from a few specimens from four localities in that country and 53 specimens from the Jalalabad area of Afghanistan. It is large sized (FA 34.5 to 42.0 mm.; CBL 11.8 to 13.4 mm.) and has dark, relatively opaque membranes (fig. 98).

The form *pellucens* was described by Thomas (1905, p. 520) from Ahwaz (=Ahvaz), Iran. If specimens previously identified as *E. walli* are included, *E. n. pellucens* is known from 15 specimens from Iraq and 18 from Iran. It is a large *E. nasutus* (FA 34.5 to 41.1 mm.; CBL 12.6 to 13.8 mm.) and has membranes that are relatively dark near their bases and become very light and transparent near their edges (fig. 98).

The specimens from Meshrageh are clearly referable to the form *E. n. pellucens* and those reported by Etemad (1973, p. 111) are probably also *E. n. pellucens*. The Minab and Baluchinstan specimens have all patagia completely pigmented and lack the very light tips characteristic of *E. n. pellucens*. However, the coloration of the Minab specimen is lighter than that of the one from Baluchistan, and both are lighter than those of the nominate form from Jalalabad, Afghanistan. On the basis of membrane coloration I tentatively refer the Minab and Baluchistan specimens to *E. n. nasutus*. The subspecific divisions of *E. nasutus* clearly need further investigation.

Specimens Examined:

I have examined most of the known specimens of *E. nasutus* including: *E. n. pellucens* from Iran (FMNH 111383-92; BM 5.10.4.2-6, including holotype BM 5.10.5.5) and Iraq (FMNH 43759-67; BM 36.4.14.13.4; BM 19.3.1.2, holotype of *E. walli*); *E. n. matschiei* from Jimel and Jedda, Arabia (BM 99.11.6.19 holotype; BM 48.350); *E. n. batinensis* from Oman (BM 68.1356 holotype); *E. n. nasutus* from Iran (FMNH 111393), Afghanistan (FMNH 102639, 102724-49; BM 68.475) and Pakistan (BM 19.11.7.13); and one of undetermined subspecies (BM 6.1.2.15), labeled "Seistan, SW Afghanistan." "If any question should arise about this specimen, there is a *possible* doubt as to its origin, as it was mislaid and afterwards found in debris."

Ecological Notes:

The Jimel specimen is a male collected on 19 August 1899 and the Jedda specimen is a male collected on 4 July 1948. In Oman, Harrison (1968, p. 323) found this species "in crevices of the walls of ruined buildings, isolated in semidesert terrain." His collection from three localities included five males and three females collected between 16 and 26 March 1967. With respect to reproductive activity Harrison (1968, p. 323) stated that "one of the females obtained on March 26th at Harmul showed evidence of early pregnancy, with enlargement of both uterine cornua. The testes of the males at this season were small."

Thomas (1919, p. 746) reported a single female from Basra, Iraq, but gave no date or habitat information. Sanborn's (1940, p. 159) series from Nasiriya, Iraq, included two males and seven females collected between 12 and 24 March 1935, but no habitat information is given. The specimens reported by Nader (1971, p. 645) are an adult male collected on 1 December 1968 from an old house at Qalat Salih, Iraq, and one old individual of undetermined sex collected on 10 April 1969 from a house at Al Miqdadiyeh, Iraq.

Gaisler's (1970, p. 24) specimens from southeastern Afghanistan include 14 males and 12 females collected from 31 March through 19

April 1967. These were brought to him by local inhabitants and "in spite of assiduous searching we failed to discover the exact localities from which the natives brought individuals of this species to us; it is unknown whether there were buildings, caves, or trees." As to reproductive status, Gaisler (1970, p. 27) observed that "all males were fully sexually active when captured while among the females there were nine active and three inactive individuals."

The specimens collected by Neuhauser (1969, p. 82) included nine males, 16 females, and two of undetermined sex collected in the vicinity of Jalalabad between 11 and 25 October 1965. Again no roost site information is available, since all specimens were shot on the wing.

Thomas (1905, p. 520) reported five males of this species collected on 28 March 1905 at Ahvaz. The tags on all of these specimens say "common in town" and on the tag of one of the specimens is the note, "Shot in the town where they were common. 11 shot one evening all ♂."

Etemad (1973, p. 111) obtained two specimens that had been collected by villagers on 27 March 1972 at a village 6 km. N Bandar-e Mashur. He did not mention the age or sex of these specimens, but from the early date and the photograph of one specimen (Etemad, 1973, p. 111) it may be assumed that they are adults.

Ten *E. nasutus* were shot by the 1968 Street Expedition as they flew along the Jahari River near Meshrageh between 17 and 21 October. This sample included three adult males, two adult females, and three males and two females that, by epiphysial ossification, appear to be young of the year. These bats began flying while it was still light. They flew low and erratically, often dipping down to almost ground level, and flew earlier, lower, and more slowly than the three species of *Rhinopoma* collected at the same locality.

The Minab specimen is an adult female shot as it flew low over the Dozdon River at dusk on 30 November 1968. The Choga Zambil specimen was collected on 21 February 1975 (Harrison, pers. comm., March, 1975).

Harrison (1968, p. 323) and Nader (1971, p. 645) are the only persons who have been able to report on roosting sites for this species. All other specimens have been purchased or shot on the wing—or if collected from a roost, no comment on the roost has been made in publications or on specimen tags.

Eptesicus bobrinskoi Kuzyakin

Eptesicus bobrinskoi Kuzyakin, 1935, Bull. Soc. Nat. Moscou, 44, pp. 435-37.

Type Locality.—Tyulek wells in Aral Kara-Kum (desert), 65 km. E city of Aralskoje More, Turkmen SSR.

Type Specimen.—In the collection of the Moscow Zoological Museum (Kuzyakin, 1950).

General Range:

Four localities in Kazakhstan USSR and one in Siberia (Bobrinskii et al., 1965, Map 33).

Iranian Distribution:

Harrison (1963, p. 303) reported seven specimens from the Sulphur Caves at Guter-Su (=Kutur Su), north of Mt. Sabalan, East Azarbaijan Province (BM 63.1186-92). This is the only known record for Iran (fig. 111). However, in view of the reported distribution of this bat in the USSR, the species potentially ranges through much of northern Iran.

Subspecies:

Only the nominate form is known. Although Ellerman and Morrison-Scott (1951, p. 154) tentatively placed *bobrinskoi* as a subspecies of *E. nasutus*, Harrison (1963, p. 303) and Hanak and Gaisler (1971) have shown that *E. nasutus* and *E. bobrinskoi* are distinct.

Specimens Examined:

I have examined only the seven Iranian specimens listed above.

Ecological Notes:

Very little is known of the ecology of this rare bat. The Iranian specimens were collected along with numerous other species found dead in a cave on 21 August 1961. They had apparently been overcome by sulphur fumes. This series includes three males, three females, and one of undetermined sex. Judging by ossification of the phalanges one male, one female, and the specimen of undetermined sex are immatures. The remaining specimens may also be young of the year.

Bobrinskii et al. (1944, p. 102) said that in the USSR *E. bobrinskoi* lives in old tombs scattered over the deserts of Kazakhstan. Three

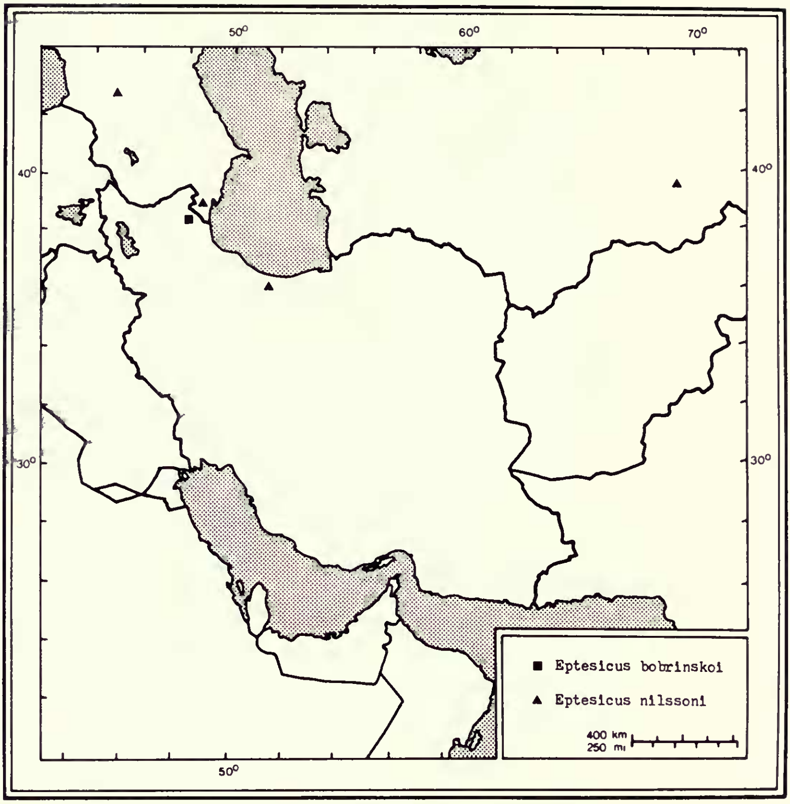

FIG. 111. Distribution of *Eptesicus bobrinskoi* and *E. nilssoni.*

specimens were caught in occupied dwellings into which they had flown through open windows.

Eptesicus nilssoni (Keyserling and Blasius)

Vespertilio nilssonii Keyserling and Blasius, 1839, Arch. Naturgesch., **5**, 1, p. 315.

Type Locality.—Sweden.

General Range:

Northern, eastern, and central Europe (van den Brink, 1968, p. 67). USSR (Bobrinskii et al., 1965, Map 33). Mongolia and northern China (Allen, 1938, p. 238). Korea (Won, 1961). Japan (Wallin, 1969, p. 314). Kashmir (Siddiqi, 1969, p. 9). Afghanistan (Felten, 1971, p. 375).

Iranian Distribution:

Lay (1967, p. 145) reported a specimen collected by the 1962 Street Expedition at Sama, Mazandaran Province (FMNH 96763). This is the only known record for Iran (fig. 111), but *E. nilssoni* very likely occurs throughout the northern mountainous areas of Iran.

Subspecies:

Eptesicus nilssoni gobiensis Bobrinskii

Eptesicus nilssonii gobiensis Bobrinskii, 1926, C. R. Acad. Sci. U.R.S.S., A, 96.

Type Locality.—Burchasteitala, Gobi Altai Mountains, Mongolia.

Range.—Mongolia, Chinese Turkistan, Tibet, Kashmir, Afghanistan, Iran, and Soviet central Asia.

The Iranian specimen appears to be too dark to fit Allen's (1938, p. 238) description of the central Asian subspecies, *E. n. gobiensis*, but is identical to five specimens from Golobolchi Nor, Mongolia, that are identified as this form in the Field Museum collections. *E. n. gobiensis* is also the subspecies Bobrinskii et al. (1965, p. 110) recognized from all of central Asia.

Specimens Examined:

In addition to the Iranian specimen listed above, I have examined five from Mongolia (FMNH 33900-05).

Ecological Notes:

The Iranian specimen is an adult male mistnetted over a grassy bluff near a stream in the Elburz Mountains on 17 August 1973 (Lay, 1967, p. 145).

Eptesicus bottae (Peters)

Vesperus bottae Peters, 1869, Monatsb. Preuss. Akad. Wiss., Berlin, p. 406.

Type Locality.—Yemen, Arabia.

Holotype.—Paris Museum No. 112. Male. Collected by Botta in 1837 (Harrison, 1964, p. 140).

General Range:

Egypt (Hayman and Hill, 1971, p. 44). Turkey (see below). Yemen, Sinai, and Iraq (Harrison, 1964, p. 144). Oman (Harrison, 1975, p. 415). Northeast Black Sea Coast, Transcaucasia, Turkmeniya, Uzbekistan, Kazakhstan, and Tadzikistan in the USSR (Bobrinskii et al., 1965, Map 35). Afghanistan (Kuzyakin 1950; Neuhauser, 1969, p. 94). Pakistan (Roberts, 1977, p. 66).

Iranian Distribution:

De Filippi (1865, p. 342) reported "*V. turcomanus*" from Sartschem (=Sar Cham) and Zendjan (=Zanjan) in northwestern Iran. I have examined his specimen of "*turcomanus*" from Zanjan (MZST 903) and have identified it as *E. bottae*.

Thomas (1905, p. 520) reported a specimen from Mala-i-Mir (=Izeh), 70 miles NE Ahwaz (=Ahvaz) (BM 5.10.5.1) and another from Telespid (BM 2.10.1.2) as "*Vespertilio* sp. near *V. serotinus*." Cheesman (1921, p. 574) listed the above two specimens and another from Basht (BM 2.10.1.1) as *Eptesicus mirza*. All three of these localities are in Khuzistan Province. These specimens have a light dorsal pelage with dark hair bases. In this and other characters they are referable to *E. bottae*.

Farhang-Azad (1969, p. 731) reported five specimens of *Eptesicus ognevi* from Chelmir, Khorasan Province (IPHR 703,717, 3 uncat.). Hanak and Gaisler (1971) have shown that *ognevi* is a subspecies of *E. bottae*. The National Museum of Natural History collection includes a specimen of *E. bottae* from 11 km. NW Darab, Fars Province (USNM 369543).

Eptesicus bottae is thus known from the southwest, northwest, and northeast corners of Iran (fig. 112). In view of this species' occurrence in Iraq, Oman, Transcaucasia, Transcaspia, and Afghanistan, it is likely that it occurs throughout western and northern Iran.

Subspecies:

Eptesicus bottae anatolicus Felten

Eptesicus anatolicus Felten, 1971, Senckenbergiana Biol., **52**(6), p. 371.

Type Locality.—Alanya, coast of southern Anatolia, Antalya Province, Turkey.

Holotype.—SMF 36478, an adult female collected on 21 May 1966.

Range.—Southern Anatolia east through the Zagros Mountains of NE Iraq and SW Iran.

Eptesicus bottae ognevi Bobrinskii

Eptesicus ognevi Bobrinskii, 1918, Fauna and Flora of Russia, **15**, p. 12.

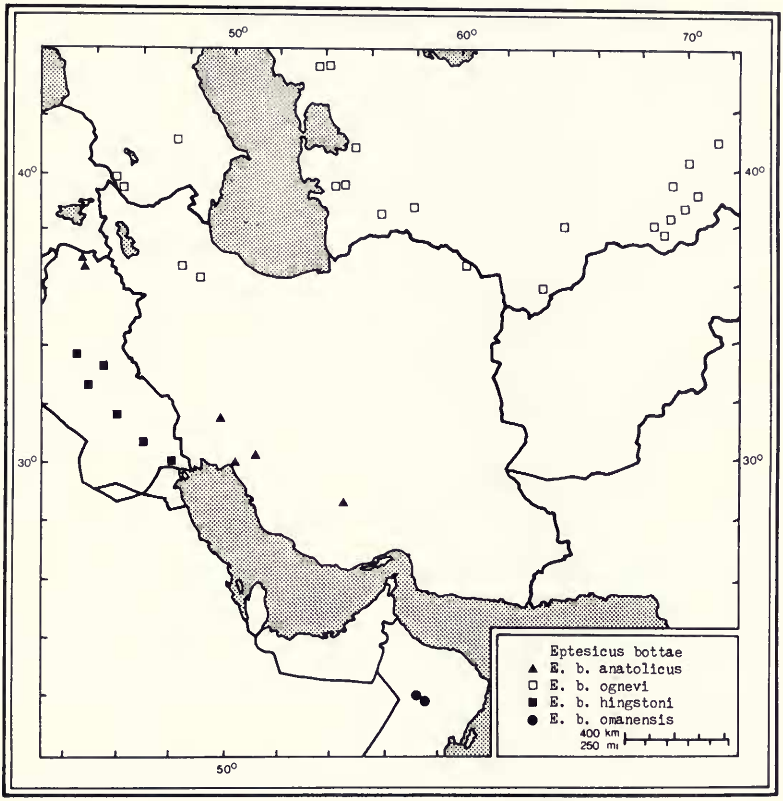

FIG. 112. Distribution of *Eptesicus bottae.*

Type Locality.—Bokhara district, Russian Turkestan.

Range.—Transcaucasia, Turkmeniya, Uzbekistan, Kazakhstan, and Tadzikistan in the USSR and northern Iran.

The systematics of the serotine bats in southwest Asia has a history of confusion. However, it is generally recognized that there are two broadly sympatric species: a larger form, *Eptesicus serotinus*, and a smaller form, *Eptesicus bottae*. In size the two species overlap, but where they occur together in any given area they are easily separable by both cranial and external measurements and by pelage color.

Harrison (1964, p. 143) has shown that *Vesperus bottae* Peters, 1869; *Vesperugo innesi* Lataste, 1887; and *Eptesicus hingstoni*

Thomas, 1919, are all representatives of the smaller species, *Eptesicus bottae*, by priority.

The specimens from Izeh, Telespid, and Basht were listed as *E. mirza* by Cheesman (1921, p. 574) and as *E. turcomanus* by Thomas (1919, pp. 745-746). Misonne (1959) did not mention these specimens in his treatment of Iranian mammals, and Lay (1967, p. 233) listed them as *E. bottae* without giving his reason for doing so.

Harrison (1956, p. 262) reported three specimens from Ser' Amadia (HZM 18.1616, 17.1615, 19.1617) and one from Kani Mase (HZM 20.1618), both localities in Kurdistan, Iraq, as *E. serotinus turcomanus*. He had compared these to the above three Iranian specimens (that were labeled *Eptesicus mirza*, a name then regarded as synonymous with *turcomanus*) and concluded that they agreed in size and characteristics. He also pointed out that all seven specimens were slightly larger than *E. hingstoni* and had strikingly darker and more opaque ears and membranes. Later, Harrison (1964, pp. 139-143) included both *E. innesi* and *E. hingstoni* as subspecies of *E. bottae*, changed his identification of the above seven specimens to an undetermined subspecies of *E. bottae*, and added that they might prove to be close to *mirza* or to *ognevi*. The former is below shown to be a synonym of *E. serotinus* and the latter has been shown to be a form of *E. bottae* (Hanak and Gaisler, 1971) that is almost identical to *E. bottae hingstoni*.

Felten (1971) described *Eptesicus anatolicus* from a single specimen collected at Alanya, Antalya Province, Turkey. He distinguished *E. anatolicus* from *E. serotinus* on the basis of the new species' smaller size and bicolored hair and from *E. bottae* on the basis of its larger size, blackish ears and wing membranes, and relatively higher braincase.

The three Iranian and four Iraqi specimens discussed above and the Darab specimen all correspond in coloration and dimensions (table 17) with Felten's (1971) description of *E. anatolicus*. I have not duplicated Felten's (1971) specialized instrument for measuring braincase height, but I have compared the skulls of these specimens with his photograph of skulls of specimens of *E. anatolicus*, *E. serotinus*, and *E. bottae hingstoni* (Felten, 1971, p. 372), and I have found that they correspond most closely to the skull of *E. anatolicus* in braincase shape and in development of the saggital crest. I thus conclude that the one Turkish, four Iraqi, and four Iranian specimens all represent the same form.

Table 17. External and Cranial Measurements of *Eptesicus bottae anatolicus*

Catalog Number	Locality	Sex	TL	T	HF	E	FA	GLS	CBL	ZW	IO	MB	C-M^3	M-M	C-M_3	ML
SMF 36478[1]	Anlanya, Turkey	♀					45	17.9	17.7	12.9	4.2	10.2	6.6	8.3		
BM 2.10.1.1	Basht, Iran	♀	126.5	48.5	10	17	49.4	18.4	17.6	12.8	4.0	10.1	6.7	8.2	7.7	13.9
BM 2.10.1.2	Telespid, Iran	♀	117.5	46.5	10	16.5	48.2	18.5	17.4	13.0	4.1	10.0	6.6	7.9	7.1	13.8
BM 5.10.4.1	Izeh, Iran	♀	111	45	9	17	46.3	17.9	17.8	12.8	3.9	10.0	6.2	—	7.4	14.1
USNM 369543	Darab, Iran	♀	112	42	9	14	47.4	18.1	17.2	12.4	4.1	—	6.8	—	7.3	13.6
HZM 17.1615	Ser'Amadia, Iraq	♂	118.8	49.7	10.9	16.4	49.4	18.4	18.0	12.8	4.0	10.0	6.4	7.7	7.2	13.1
HZM 19.1617	Ser'Amadia, Iraq	♂	113.5	45.8	9.7	16.5	47.1	17.8	17.1	—	4.1	9.8	6.4	7.8	6.8	12.7
HZM 18.1616[2]	Ser'Amadia, Iraq	♂	120.7	52.3	9.4	18	47.8	18.0	17.3	—	3.8	—	6.0	—	6.8	13.0
HZM 20.1618[2]	Kani Mase, Iraq	♀	107.8	46.5	9.2	15.9	46.2	17.2	16.5	—	3.4	—	6.0	—	6.8	12.6

[1] Measurements of the holotype from Felten (1971).

[2] Measurements from Harrison (1964).

E. anatolicus is specifically distinct from *E. serotinus*. In southeastern Iran it is sympatric with *E. s. shiraziensis* and, if *anatolicus* logically may be expected to have a continuous distribution from southwestern Anatolia to northern Iraq, it must be sympatric with *E. s. serotinus*, which has been reported as far south as Lebanon and Israel (Harrison, 1964, p. 139). I also agree that *anatolicus* is different from *E. bottae hingstoni* and the other presently recognized forms of this species (fig. 95). But I do not feel that this latter difference warrants full specific distinction. In no area is *anatolicus* shown to be sympatric with another form of *E. bottae*. In fact, since the closest form, *E. b. hingstoni*, is known only from the Tigris-Euphrates lowland and *anatolicus* is known only from mountainous areas of Turkey, Iraq, and Iran, it is unlikely that the two forms will be found sympatrically. *Eptesicus anatolicus* Felten should thus be regarded as *Eptesicus bottae anatolicus* unless or until sympatry with *E. b. hingstoni* or *E. b. ognevi* demonstrates that full specific status is warranted.

Farhang-Azad (1969, p. 731) reported the Chelmir specimens as *E. ognevi*, and Hanak and Gaisler (1971) have shown this to be a subspecies of *E. bottae* that is almost identical to *E. hingstoni*. I have examined the specimen from Zanjan reported as *V. turcomanus* by De Filippi (1865, p. 342). By size, color, and geography it is referable to *E. b. ognevi*, and it is likely that De Filippi's (1865, p. 342) specimen from Sar Cham is also *E. b. ognevi*.

Specimens Examined:

In addition to the nine Iranian specimens for which catalog numbers are listed above, I have examined the holotype of *E. hingstoni* from Iraq (BM 19.3.1.1), the lectotype of *Vesperugo innesi* from Egypt (BM 19.7.7.3528), two *E. b. anatolicus* from Iraq (HZM 17.1615, 19.1617), 10 *E. b. hingstoni* from Iraq (BM 36.4.14.9-12, and two numbered 21.3.1.1; HZM 4.1627, 5.1628; TCWC 20967-8), and four *E. b. ognevi* from the USSR (ZMMU uncat.).

Ecological Notes:

The Izeh specimen is reported by Thomas (1905, p. 520) as a female collected at 4,300 ft. but he gave no further data on the Telespid specimen. The tag of the Izeh specimen is dated 10 April 1905 and bears the line "Shot among the oak trees on the hillside, they hang up during the day in the old trees." The tag on the female from Telespid is dated 13 June 1902.

Cheesman (1921, p. 574) reported a female from Basht, altitude 4,000 ft., and quoted from the specimen tag "shot flying about at sunset in rocky places with trees." Cheesman (1921, p. 574) also gave the altitude for Telespid as 3,200 ft. and quoted the lines given above from the Izeh specimen's tag.

Harrison (1964, p. 143) said that the specimens of *E. b. anatolicus* from Ser' Amadia in Iraqi Kurdistan were found at 6,000 ft. flying over steep rocky mountain slopes, where the bats were evidently feeding on numerous insects gathering around electric lights erected to illuminate a path. These specimens are three males collected from 17 to 21 August 1954.

The Chelmir specimens of *E. b. ognevi* are five males mistnetted over a stream in July, 1968, and the Zanjan specimen is an adult male with no ecological data. The Darab specimen is an immature female shot on 10 July 1965.

Bobrinskii et al. (1944, p. 103) said that *ognevi* lives in "holes in mud and stone walls, rock crevices, small cave-like shelters, etc. It apparently never forms large colonies but occurs as single specimens or in groups of few individuals."

Eptesicus serotinus (Schreber)

Vespertilio serotinus Schreber, 1774, Die Saugethiere, I, pl. 53 (text, p. 167).

Type Locality.—France.

General Range:

Morocco, Tunisia, and Libya (Hayman and Hill, 1971, p. 44). Europe except northern British Isles and Scandinavia (van den Brink, 1968, p. 67). Turkey (Çağlar, 1965). Lebanon and Israel (Harrison, 1964, p. 140). USSR from Europe to eastern Kazakhstan south of 55°N (Bobrinskii et al., 1965). Afghanistan (Gaisler, 1970). Pakistan (Roberts, 1977, p. 67). Mongolia and northern China (Allen, 1938). Korea (Won, 1961, p. 52). Kashmir and Rajputana (Ellerman and Morrison-Scott, 1951, p. 156).

Iranian Distribution:

Iranian records for this species are listed in Table 18 and mapped in Figure 113. *Eptesicus serotinus* is known from many areas in northern Iran and from Shiraz in the south. It probably extends through the Zagros Mountains between these two areas as well.

Table 18. Records of *Eptesicus serotinus* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
De Filippi (1865, p. 343)	Kazvin (=Qazvin)	CEN	—	—	1862	*serotinus*	MZST 902	Holotype of *V. mirza*, not known from which of the two localities.
	Zendzan (=Zanjan)	ZAN	—	—	1862	*serotinus*		
Dobson (1871, p. 459)	Shiraz	FAS	1	1♀	—	*shiraziensis*	BM 74.11.21.31	Holotype of *V. shiraziensis*.
Blanford (1876, p. 21)	Shiraz	FAS	—	—	—	—	—	
Vereshchagin (1959, p. 653)	Near Khvoy (Lay, 1967, p. 145)	WAZ	—	—	—	—	—	Dot on range map.
Harrison (1963, p. 303)	Guter Su (=Kutur Su)	EAZ	1	1♂	21 Aug. 1961	*serotinus*	BM 63.1185	Adult found mummified with several other species in Sulphur Cave on N side of Mt. Sabalan.
	Foot of Elburz Mts. SE Caspian	MAZ	2	2 ?	—	*serotinus*	BM 10.8.12.1-2	One labeled "N side of Mt. Demavend."
Etemad (1967, p. 278)	Shahr Abad village, 10 km. E Mashad (=Mashhad)	KHR	—	—	—	*turcomanus?*	—	

Table 18. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
Lay (1967, p. 145)	Sama	MAZ	1	1♂	17 Aug. 1962	*serotinus*	FMNH 96765	Mistnetted over pond.
	Pahlavi Dezh	MAZ	12	1♂ 2♀ 3 ?	28 Oct. 1962	*serotinus*	FMNH 98403-14	Six mummies, six skulls; 1♂ and 1 ? immature. Others adult.
	Karaj	CEN	1	—	—	*serotinus?*	—	Specimen in Karaj Agricultural University Museum.
	Zarghum	FAS	1	1♀	"2.7.20"	*shiraziensis*	BM 25.10.4.10	
Farhang-Azad (1969, p. 731)	Chelmir	KHR	1	1♂	July, 1968	*turcomanus*	IPHR uncat.	Mistnetted over stream.
Farhang-Azad (1970)	Chelmir	KHR	4	—	July, 1969	*turcomanus?*	—	
New Records	Mohammed Reza Shah National Park	MAZ	2	1♂	25 June 1969	*serotinus*	MMTT 236; 239	"Caught by net over river."

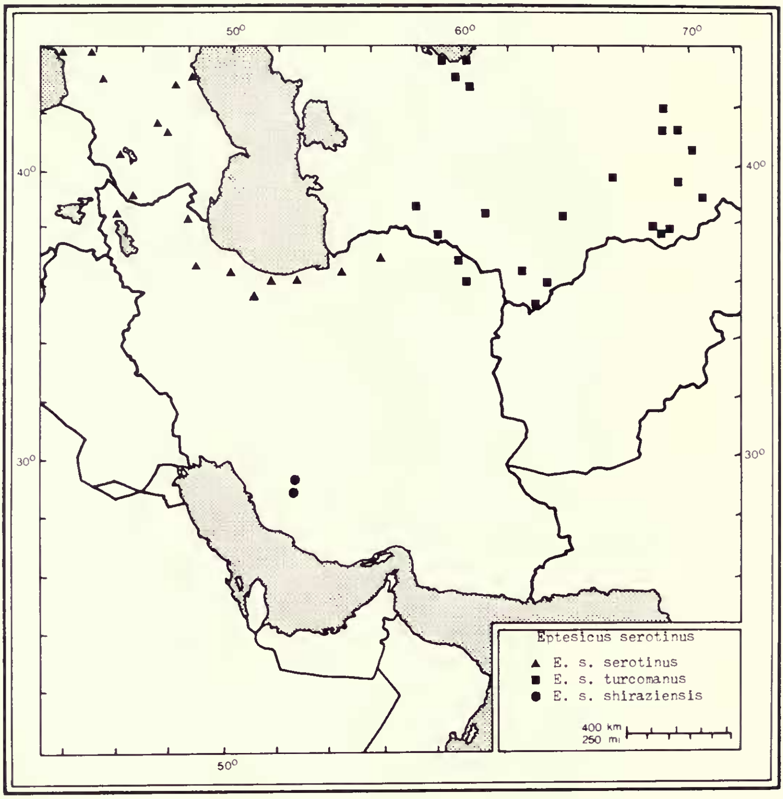

FIG. 113. Distribution of *Eptesicus serotinus*.

Subspecies:

Eptesicus serotinus serotinus (Schreber) (see above)

Eptesicus serotinus turcomanus (Eversmann)

Vespertilio turcomanus Eversmann, 1840, Bull. Soc. Nat. Moscou, p. 21.

Type Locality.—Between Caspian and Aral Seas, Russian Turkestan.

Range.—Soviet Central Asia and NE Iran.

Eptesicus serotinus shiraziensis (Dobson)

Vesperus shiraziensis Dobson, 1871, Jour. Asiat. Soc. Bengal, **40**(2), p. 459.

Type Locality.—Shiraz, 4,750 ft., SW Iran.

Holotype.—BM 25.10.4.10, an adult female collected on "2.7.20."

Range.—Known only from Shiraz and Zarghum, Fars Province, Iran.

The taxonomy of the larger serotine bats, *Eptesicus serotinus*, in Iran, is only slightly less confused than that of *E. bottae*. Three forms of large serotines have been reported from southwest Asia.

The nominate form has been reported from Israel, Jordan (Harrison, 1964, p. 139), and the Caucasus (Bobrinskii et al., 1965, p. 112). Harrison (1963, p. 303) said that the specimens from Kutur Su and the Elburz Mountains are probably referable to the nominate race.

The form *turcomanus* Eversmann, 1840, was described from "between the Caspian and Aral Seas, Russian Turkestan." It has been reported from the Transcaspian region of the USSR (Ognev, 1928; Bobrinskii et al., 1965), from Afghanistan (Gaisler et al., 1968; Gaisler, 1970) and from Mongolia and northern China (Allen, 1938). In Iran De Filippi (1865) reported *turcomanus* from Sar Cham and Zanjan. I have examined one of these and found it to be *E. bottae ognevi*. I included both of these localities in the list for *E. bottae* rather than in the list for *E. serotinus*.

The form *shiraziensis* Dobson, 1871, was described from Shiraz and has been reported only from the Shiraz area of Fars Province, Iran.

Gaisler (1970, p. 28) distinguished the three forms as follows: *E. s. serotinus*, "dorsal side dark brown or greyish brown, sometimes with feeble golden tinge, ventral side paler, testaceous. Auricles and wing membranes black"; *E. s. turcomanus*, "pale 'desert' brown on the dorsum; lower side of body dirty white. Auricles and wing membranes light brown"; *E. s. shiraziensis*, "Coloration identical with ssp. *turcomanus*. Although the holotype and the topotype are more robust than the specimens of ssp. *turcomanus* examined, it is possible that *shiraziensis* is synonymous with *turcomanus*."

The Iranian specimens from Mohammed Reza Shah National Park; Pahlavi Dezh; Sama; Elburz Mountains SE Caspian, N side Mt. Demavend; and Kutur Su all have dark pelage and are referable to the nominate form, *E. s. serotinus*. This is to be expected since the fauna of the north slope of the Elburz Mountains has a greater similarity to that of the Caucasus than to the more arid areas of Iran and Transcaspia. Etemad (1969, p. 147) said that the specimens from the northern part of Iran are *E. s. turcomanus*, but the dark color of all I have examined contradicts this identification.

Chelmir and Shahr Abad are on the north edge of the Iranian Plateau near the border of Soviet Turkmeniya. Farhang-Azad (1969) did not designate subspecies for the Chelmir specimens and Etemad (1969, p. 147) said that those from Shahr Abad could be *E. s. shiraziensis*. However, the measurements he gives for a specimen from this locality are well under those of the Shiraz specimens. I have examined one of the Chelmir specimens and found it to be *E. s. turcomanus*, the form reported from adjacent areas of the USSR (Bobrinskii et al., 1965, Map 35). It is likely that the Shahr Abad specimens are also referable to this subspecies.

Dobson (1876, p. 21) said with respect to *shiraziensis*, "I found this bat abundant close to Shiraz. I shot several in the evening just outside the city." However, only two specimens are to be found in the British Museum: the type of *shiraziensis* Dobson, collected at Shiraz by W. T. Blanford with its tag dated "1/5/17," (probably should be 1/5/71) and a specimen labeled "Topotype of *E. shiraziensis*, Zarghum, 52°44′E, 29°48′N about 5150 alt., by Lt. Col. J. E. B. H." and dated "2.7.20."

Gaisler (1970) considered *shiraziensis* to be very similar to, and probably synonymous with, *turcomanus*. On the basis of color the two forms are very similar; however, the only two specimens of *shiraziensis* are definitely larger than *turcomanus*. This larger size is not evident from the measurements presented as *shiraziensis* by Gaisler (1970, pp. 30, 32), because these include other forms as well. Of the four "*schiraziensis* [sic], Iran, Coll. BMNH" listed by Gaisler for external measurements, only one, the Zarghum specimen, is, in fact, *shiraziensis*. The other three are *E. bottae anatolicus*. In his table of cranial measurements, Gaisler (1970, p. 32) presented those of the type of *shiraziensis* and then listed three specimens as "*shiraziensis*, Iran Coll. BMNH." The first of these is one of the above three *E. b. anatolicus*, and most of its measurements are smaller than any other specimen in Gaisler's table. The second is the Zarghum specimen of *shiraziensis*, and the third is the Kutur Su specimen that by color is *E. s. serotinus*. If these extraneous specimens are eliminated from Gaisler's table and the two remaining specimens of *shiraziensis* are compared to the other measurements presented, *shiraziensis* is seen to be conspicuously larger than *turcomanus* and the nominate form in all measurements of cranial length (GL, CBL, $C\text{-}M^3$, $C\text{-}M_3$, ML), and to average larger in other cranial measurements and in forearm length.

Details of coloration can also be used to distinguish *shiraziensis* from *turcomanus*. Hanak and Gaisler (1971, p. 15) have described the pelage of *E. s. turcomanus* as "unicolor"; however, dorsal hairs on two specimens from central Asia (ZMMU S-86101 from Kushka and S-96101 from Tashkent) have very pale bases that grade to a wide, darker buff band and are tipped with a very light buff. Gaisler (1970, p. 28) characterized *E. s. shiraziensis* as having "coloration identical with ssp. *turcomanus*," and in gross appearance this is true. However, *E. s. shiraziensis* (BM 25.10.4.10) has dorsal hairs with bases slightly darker than their buffy shafts, rather than lighter than the shafts as they are in *turcomanus*. The arrangement of color bands on the dorsal hairs of BM 25.10.4.10 is essentially identical to that on *E. s. serotinus* (FMNH 96765), but all bands are considerably lighter. The dorsal hairs of the Sama specimen of *E. s. serotinus* (FMNH 96765) have a dark brown basal band that grades into a slightly lighter band. This, in turn, changes abruptly to a brown band even darker than the hair base and finally grades to an almost golden tip.

Although *shiraziensis* may prove to be synonymous with *turcomanus* when more specimens are available for study, the larger size of the two presently known specimens, their differences in dorsal pelage color banding, and their separation from the closest known *turcomanus* by almost 1,000 km. indicate that *E. s. shiraziensis* should continue to be regarded as a valid subspecies.

THE TAXONOMIC STATUS OF *Vespertilio mirza* DE FILIPPI, 1965:

In 1862 De Filippi collected bats at Zendjan (=Zanjan) and Kazvin (=Qazvin) in northeastern Iran and subsequently described them as *Vespertilio mirza* (De Filippi, 1865, p. 342). Since this publication is relatively unavailable and the description is short, it is quoted below.

> *Vespertilio (Vesperus) mirza* De Fil.
>
> *V. serotino affinis, sed rictu longiore. Supra cofeinogrisescens, vellere longo, mitore sereco, subtus griseo-fulvus. Alis et articulis aterramis.*
>
> Affine al Vespertilio serotinus, ma distinto pe' colori, e pel muso piv allungato, di nodo che la distinza dall'angolo dell' orecchio alla punta del naso è maggiore dell' altezza dell' orecchio stesso, mentre nel serotinus è subeguale.

In addition to the above De Filippi also listed a series of measurements that Blanford (1876, p. 22) translated as follows:

	Metre.
From the elbow to the point of the extended wing	0.135
From one elbow to the other, with wings extended	0.076
From the anus to the muzzle	0.085
From the angle of the ear to the point of the nose	0.021
Height of the ear	0.015

De Filippi regarded *V. mirza* as allied to *E. serotinus* but distinguishable on the basis of coloration and having a snout longer than its ears. Blanford (1876, p. 22) regarded coloration to be "very variable and of small importance in the determination of species" in bats. It is impossible to tell from De Filippi's description if the measurements were taken from the fresh specimen or from the mounted skin. In any case these measurements are of little use for comparison. Blanford (1876) listed *mirza* as a full species and commented that it was possibly the same as *V. shiraziensis* Dobson, 1871. He also reported that Dobson doubted that either *mirza* or *shiraziensis* should be kept distinct from *serotinus*. Dobson later (1878, p. 191) listed *mirza* and *shiraziensis*, as well as most other larger *Eptesicus* described from the Palearctic, as synonyms of *serotinus*. Ellerman and Morrison-Scott (1951, p. 157) listed *mirza* as a synonym of *Eptesicus serotinus turcomanus* Eversmann, 1840, but preceded the entry with a question mark. Since then several authors (e. g., Misonne, 1959, p. 26; Lay, 1967, p. 145; Etemad, 1969E, p. 14) have included *mirza* in their listings of *Eptesicus serotinus*. However, since no one has mentioned examining the holotype since Blanford (1876), some doubt has remained as to the correct identification of *V. mirza*. A major factor contributing to this doubt is that De Filippi (1865) also reported collecting *V. turcomanus* at Sartschem (=Sar Cham) and Zanjan. If *mirza* is, in fact, referable to *E. serotinus*, why was it described when De Filippi had collected *E. s. turcomanus* at the same locality?

The holotype of *V. mirza* and a specimen De Filippi had identified as *V. turcomanus* are both mounted with wings and uropatagium fully extended, skull enclosed, and jaws open. Specimen MZST 903 was identified by De Filippi as *V. turcomanus*; however, it is an adult male that is considerably smaller than *E. s. turcomanus*. Forearms of four *E. s. turcomanus* from the USSR range from 48.0 mm. to 52.3 mm. and average 49.6 mm. Specimen MZST 903, with a forearm of 43.1 mm., is much closer in size to four *E. bottae ognevi* from the USSR that have forearms ranging from 42.0 to 44.5 mm. and averaging 43.1 mm., and four *E. b. hingstoni* from Iraq that have forearms ranging from 42.9 to 45.6 mm. and averaging 44.1 mm. *Eptesicus s. turcomanus* normally has dorsal hairs that are distinctly lighter at the base, and both *E. b. ognevi* and *E. b. hingstoni* normally have dorsal hairs that are distinctly darker at the base. The dorsal hairs of MZST 903 are distinctly darker at the base. By both size and coloration the specimen that De Filippi had identified as *V. turcomanus* must be regarded as *E. bottae*. The two forms of *E. bottae* discussed above are extremely similar and the specimen collected by De Filippi was taken from a locality between the known distributions of the two.

The holotype of *mirza* is considerably larger than *E. bottae*. The following measurements, in millimeters, were taken from the *mirza* holotype (MZST 902) with dial calipers: length of tail vertebrae (still intact and dried fairly straight), 44.9; length of hind foot including claws, 12.8; length of hind foot excluding claws, 10.6; length of tibia, 20.0; length and greatest breadth of left tragus, 6.4 by 2.3; length of forearm, 53.8; length of thumb including claw, 8.3; length of thumb excluding claw, 7.2; length of metacarpal and phalanges of third digit, 50.1, 19.1, 11.3, fourth digit 50.0, 17.4, 13.0, and fifth digit, 47.4, 12.1, 8.9. A few cranial and dental measurements are possible. The breadth across the outside of the canines is 6.5 mm. and the greatest breadth across the outside of the molars is 9.1 mm. The length from upper canine to last molar was estimated at 8.0 mm. by placing the calipers at the appropriate points outside the dried lips. A distinct saggital crest and the posterodorsal apex of the skull may be felt through the dried skin on the top of the head. The length from this apex to the anterior side of the upper incisors is 22.7 mm. The zygomatic arches feel as though they are covered only by the skin. The greatest distance across them is 14.2 mm.

It is impossible to determine to what extent the coloration of the specimen has been affected by fading or accumulated dirt. The top of the head, backs of the ears, and shoulder areas are obviously blackened by grime. The remainder of the skin is fairly light, but presumably it is badly faded. The left ear is slightly folded and the more protected portion is considerably darker than other naked skin areas. The calcar extends just over one-third of the distance from ankle to tail, and a small keel of skin protrudes posteriorly from it.

The dorsal pelage is golden brown in general appearance. The hairs have dark brown bases that change abruptly to a distinct but narrow light band. This in turn abruptly gives way to a brown that is dark but lighter than the hair base. This brown band grades gradually into a lighter golden brown tip. The dorsal hairs are long, 8 to 10 mm. in the center of the back. The overall coloration of the ventral surface is a yellowish buff. Ventral hairs are buff colored through most of their length but have darker bases and lighter tips.

The *mirza* holotype is a female. The epiphyses of wing bones are fully ossified, but the teeth are only very slightly worn, so I judge it to be a young adult.

I have examined and measured 34 specimens of *E. serotinus* from Greece, Transcaucasian USSR, Central Asian USSR, Afghanistan, and Iran. The measurements given above for the holotype of *mirza* are within the range of variation for these specimens and of those published by Gaisler (1970, pp. 29-32) and others for *E. serotinus*. After direct comparison of the *mirza* holotype with these other specimens and with descriptions in the literature I can find no reason to regard *Vespertilio mirza* De Filippi as distinct species and believe it is properly placed in synonymy with *E. serotinus* (Schreber), 1774.

The color banding of the hairs of the holotype of *mirza* is intermediate between those of *E. s. serotinus* and *E. s. shiraziensis* from Iran. The localities from which De Filippi (1865, p. 343) reported *mirza* are situated between those known in Iran and the USSR for *E. s. serotinus* and that for *E. s. shiraziensis* in southern Iran. The forearm and upper toothrow measurements of the *mirza* holotype approach those of *E. s. shiraziensis* in size but are still within the range for specimens of the nominate form from the USSR. The lighter coloration of the *mirza* holotype must, at least partially, be due to fading. However, the uniformly colored ventral hairs could not have faded evenly for their entire length.

Since, allowing for fading, the color of the *mirza* holotype is closer to the nominate form, and since the locality in which *mirza* was collected is much closer geographically and more similar ecologically to the known range of *E. s. serotinus*, I regard *Vespertilio mirza* De Filippi as a synonym of *E. s. serotinus*.

De Filippi (1865, p. 343) reported *mirza* from two localities, Zanjan (36° 40′ N, 48° 29′ E) and Qazvin (36° 16′ N, 50° 00′ E) but did not indicate from which the holotype was collected. The tag on the holotype reads merely "Persia." It is thus impossible to determine which of these two cities should be regarded as the type locality.

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are given in Table 18, I have examined two *E. s. serotinus* from Greece (FMNH 44115-6), five *E. s. turcomanus* from Soviet central Asia (ZMMU S-86101, S-94804; BM 7.1.1.357, 7.1.1.707, 62.2.4.23), six *E. s. pashtonus* from Afghanistan (BM 69.786, Holotype, 68.476, 68.787; FMNH 102499-501), and four *E. s. isabellinus* from Morocco and Algeria (BM 19.7.7.1160, 19.7.7.1232, 63.1585-6).

Ecological Notes:

On 28 October 1962 Lay (1967, p. 145) collected mummies of two adult females, one immature male, and two adult and one immature of undetermined sex from attics beneath tin roofs at Pahlavi Dezh. He also collected "one live individual which subsequently escaped." According to local inhabitants, "thousands" of bats occupied these attics during the summer. Lay also reported collecting mummies of *P. pipistrellus* from attics under tin roofs at Pahlavi Dezh but did not say if the two species were found in the same attics. Harrison (1963, p. 303) also reported a specimen found mummified in a cave.

The other Iranian specimens were either mistnetted over streams between 25 June through 17 August or lack detailed information on date and circumstances of collection. Etemad (1969, p. F146) said that *E. serotinus* occur in old houses under roofs and between walls, in cracks in rocks, and occasionally in caves, but are usually found near human habitation.

Nyctalus leisleri (Kuhl)

Vespertilio leisleri Kuhl, 1818, Ann. Wetterau Ges. Gesammte Naturk., 4, I, p. 46.

Type Locality.—Hannau, Hessen-Nassau, Germany.

General Range:

Ireland, England, the Netherlands, France, Portugal, Italy, Yugoslavia, Bulgaria, Greece, Thrace, and central Europe from Switzerland to the USSR (van den Brink, 1968, p. 71). USSR west of the Caspian Sea and south of 58°N latitude. Kashmir and Punjab (Gaisler, 1970, p. 36). Afghanistan (Neuhauser and DeBlase, 1974).

Iranian Distribution:

Lay (1967, p. 144) reported three specimens collected at Sama, Mazandaran Province, as *N. noctula*. Neuhauser and DeBlase

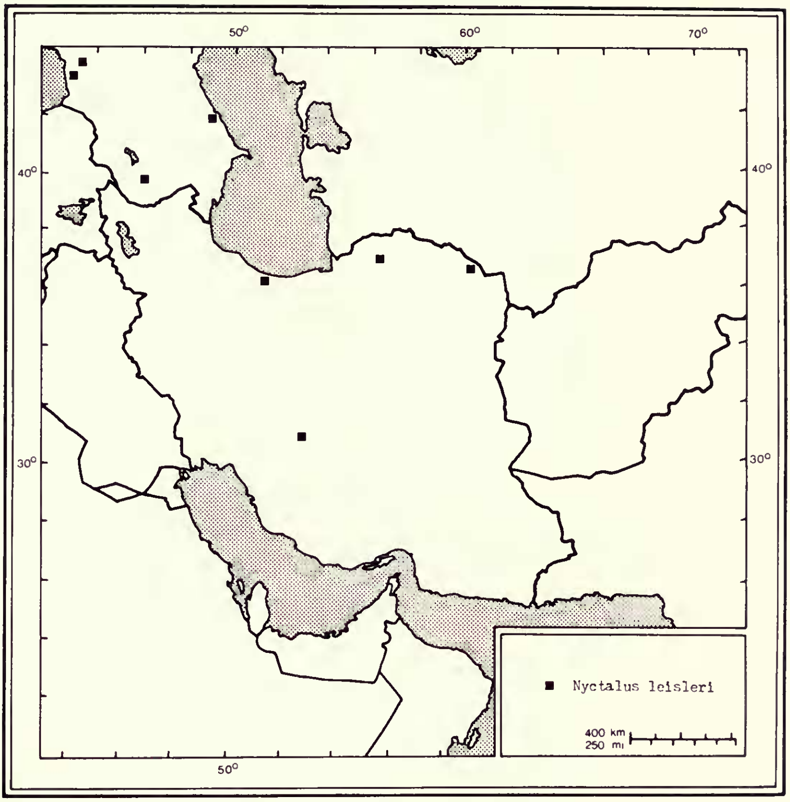

FIG. 114. Distribution of *Nyctalus leisleri.*

(1974, p. 88) re-examined these specimens (FMNH 96760-2) and found them to be *N. leisleri*. Farhang-Azad (1970) reported one *N. leisleri* from Chelmir, Khorasan Province, and two from Chelzari, 40 km. SE Abadeh, Fars Province. Two *N. leisleri* in the collections of the Iran National Museum of Natural History were collected on 29 June 1969, 3 km. S of the Tangeh Road at Mohammed Reza Shah National Park (MMTT 237-8).

Nyctalus leisleri is known from Caucasia and Afghanistan. It probably occurs throughout the northern mountains of Iran that link these two areas, and the Chelzari records indicate that it ranges south down the Zagros Mountains as well.

Subspecies:

Gaisler (1970) and Neuhauser and DeBlase (1974, p. 88) have shown that *N. montanus* Barret-Hamilton, 1906, is a valid species and not a subspecies of *N. leisleri*; thus only the nominate form is recognized.

Specimens Examined:

In addition to the Sama and MRS National Park specimens listed above, I have examined one from Afghanistan (FMNH 102760).

Ecological Notes:

The Sama specimens were mistnetted over "a pool behind a jube diversion dam in the mountain stream" (Lay, 1967, p. 144). The specimens include one adult female and one immature female netted on 18 August 1962 and one adult female netted on 20 August 1962. Lay (1967, p. 144) examined the latter female for embryos but found none. The MRS National Park specimens are a male and a female mistnetted on 29 June over a river at night.

Nyctalus noctula (Schreber)

Vespertilio noctula Schreber, 1774, Die Saugethiere, I, pl. 52 (text, p. 166).

Type Locality.—France.

General Range:

Morocco and ?Mozambique (Hayman and Hill, 1971, p. 37). Europe except northwest Spain, Ireland, and northern Scandinavia (van den Brink, 1968, p. 71). Lebanon, Jordan, and ?southern Anatolia (Harrison, 1964, p. 117). USSR south of 60°N latitude and west of 55°E longitude and near the southern border from the Aral Sea to the Ob River (Bobrinskii et al., 1965, Map 29). Pakistan (Roberts, 1977, p. 69). China (Allen, 1938). Japan (Wallin, 1969). Nepal, Kashmir, and Burma to the Altai Mountains (Ellerman and Morrison-Scott, 1951).

Iranian Distribution:

Thomas (1907, p. 197) reported this species from Resht (=Rasht), Gilan Province (BM 7.7.14.1-2), and Bianki (1917, p. viii) reported it from Ashraf (=Behshahr), to the south of Astrabad Bay, Mazandaran Province. Etemad (1969, p. 14) reported it from Shahsavar, Mazandaran Province (IPHR 12 uncat.). Lay (1967, p. 144) reported three specimens from Sama, Mazandaran Province. However, these are *N. leisleri* and not *N. noctula* (Neuhauser and DeBlase, 1974, p. 88). Farhang-Azad (1970) reported 49 *N. noctula* from Siahkal, Gilan Province (IPHR 138). In Iran *N. noctula* is probably restricted

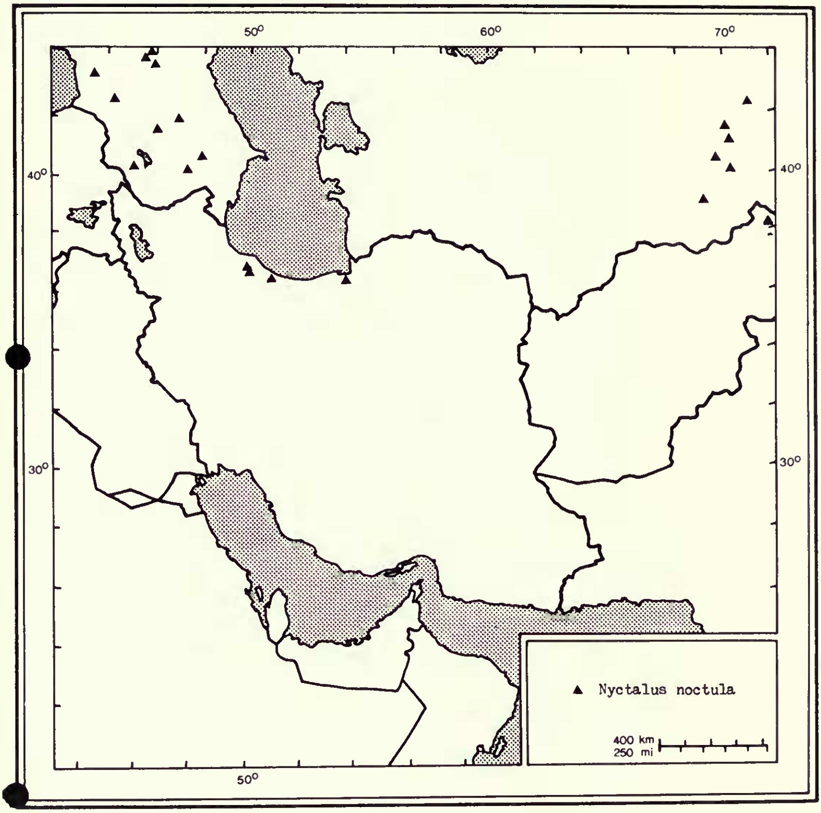

FIG. 115. Distribution of *Nyctalus noctula.*

to the Elburz Mountains and the mountains of northern Azarbaijan (fig. 115).

Subspecies:

Nyctalus noctula noctula (Schreber) (see above)

Harrison (1962, p. 338) said that the *N. noctula* from northern Iran are "clearly referable to the typical race," but in his discussion he did not mention *N. n. princeps* Ognev and Worobiev, 1923. Ognev (1928, p. 389) keyed *N. n. princeps* from *N. n. noctula* on the basis of size, with *N. n. princeps* having "Dimensions relatively large. Condylobasal length 19.1-20.1 (average 19.4) mm.; zygomatic width 13-14.5 (average 13.8) mm. Upper toothrow 7.4-8.3 (average 7.7) mm. Length of body and head 70-85 mm." and *N. n. noctula* having

"Dimensions somewhat smaller. Condylobasal length 17.4-19.4 (average 18.27) mm.; zygomatic width 13-14.5 (average 13.03) mm. Upper toothrow 6.8-7.4 (average 7.1) mm. Forearm 51-54 (average 52.5) mm. Length of body 69-79 mm."

Kuzyakin placed *N. n. princeps* in synonymy with the nominate form in 1950 (p. 334), but in 1965, as a co-author of Bobrinskii et al. (1965, p. 102), he recognized only *N. n. princeps* from the western USSR and said that this form is slightly larger in skull measurements than the nominate western European form.

Measurements (Appendix I) of the specimens from Rasht, Shahsavar, and Siahkal are below those given by Ognev (1928, p. 389) for *N. n. princeps*. Thus, I agree with Harrison (1962) in listing the nominate form for Iran.

Specimens Examined:

In addition to the Iranian specimens for which catalog number are listed above, I have examined three from Bavaria (FMNH 23448-50), two from Lebanon (BM 61.406, holotype of *N. n. lebanoticus* Harrison, 1962; FMNH 99566), and one from Turkestan SSR (FMNH 48737).

Ecological Notes:

Thomas (1907, p. 197) reported the two Rasht specimens as males but gave no further data. According to the specimen tags, both were collected on 21 May 1907 "from old houses on the coast" at 0′ elevation.

Etemad (1969, p. 153) said that this species is usually found in hollow trees, under gable roofs of houses, and rarely in caves and crevices in rocks. He further stated that when they are pregnant the females form sexually segregated colonies in hollow trees, but when not pregnant the females form colonies with males. He gave the gestation period as 50 to 70 days and the litter size as one or two, rarely three.

The 10 Shahsavar specimens in the IPHR collection were all collected on 19 June 1968. The Siahkal specimens were collected in mid-June, 1969. The one specimen from this series that I have examined is an adult female with enlarged nipples (IPHR 138).

Nyctalus lasiopterus (Schreber)

Vespertilio lasiopterus Schreber, 1780, *in* Zimmerman, Geographische geschichte des Menschen, **2**, p. 412.

Type Locality.—"?Northern Italy (Chaworth-Musters)" (Ellerman and Morrison-Scott, 1951).

General Range:

Scattered localities in central France, Switzerland, Spain, Italy, ?Sicily, Dalmatia, Croatia, Rumania, and Bulgaria (van den Brink, 1968, p. 72). Greece (Wolf, 1964, pp. 183-184). Turkey (Kumerloeve, 1975a, p. 90). European Russia from Moscow to the Caucasus (Bobrinskii et al., 1965, Map 28). Japan, Korea, Shaweishan Island off the mouth of the Yangtsekiang River, China, and ?Manchuria (Wallin, 1969, p. 317).

Iranian Distribution:

Etemad (1970, p. 547) reported a specimen from "near Roudsar (=Rud Sar), northern part of Iran, near 37°N latitude," Gilan Province, that was collected on 11 October 1969. This record (fig. 116) is the southernmost point for this species in western Eurasia (Etemad, 1970, p. 547). In Iran *N. lasiopterus* is probably restricted to the Elburz Mountains and Caspian coastal plain.

Subspecies:

Nyctalus lasiopterus lasiopterus (Schreber) (see above)

Only the nominate form is recognized in western Eurasia (Ellerman and Morrison-Scott, 1951, p. 161).

Specimens Examined:

None.

Pipistrellus pipistrellus (Schreber)

Vespertilio pipistrellus Schreber, 1774, Die Saugethiere, 1, pl. 54 (text, p. 167).

Type Locality.—France.

General Range:

Morocco (Hayman and Hill, 1971, p. 40). Europe except southern Portugal and northern Scandinavia (van den Brink, 1968). Turkey (Çağlar, 1965). Lebanon (Harrison, 1964). European USSR south of about 57°N latitude and west of 50°E longitude, and Turkmeniya, Uzbekhistan, Tadzikistan, and Kazakhstan (Bobrinskii et al., 1965, Map 31). Iran, Afghanistan, Kashmir, and northern China (Neuhauser and DeBlase, 1971). Ellerman and Morrison-Scott

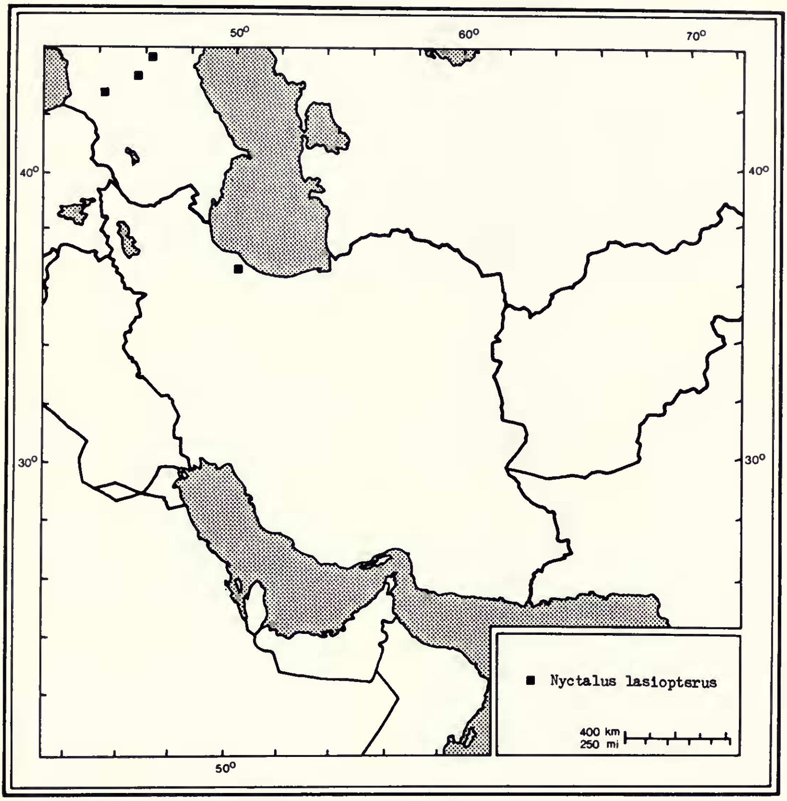

FIG. 116. Distribution of *Nyctalus lasiopterus*.

(1951, p. 163) listed Japan, Formosa, and Korea, but Wallin (1969, p. 392) specifically excluded these nations.

Iranian Distribution:

Records of *P. pipistrellus* from Iran are listed in Table 19 and mapped in Figure 117. In his 1969 discussion of *P. kuhli*, Etemad (1969, p. F175) described the Kazerun specimen that he first reported in 1967 as having an extremely narrow white wing margin. On the basis of this description I include this record as *P. p. aladdin* rather than *P. kuhli*. Farhang-Azad (1971) listed one *P. pipistrellus* from 20 km. W Tabus (=Tabas) and 12 from Salehabad (=Sahlabad), 130 km. S Birjand. I have examined the Tabas specimen and two of the series from Sahlabad and found them to be *P.*

TABLE 19. Records of *Pipistrellus pipistrellus* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
Thomas (1907, p. 197)	South Coast of Caspian Sea (150 ft.)	GIL or MAZ	1	1♂	28 March 1907	*pipistrellus*	BM 7.7.14.4	"Plentiful in the forests at foot of hills."
Vereshchagin (1959, p. 651)	Khvoy (Lay, 1967, p. 142)	WAZ	—	—	—	?	—	Dot on range map.
Etemad (1967, p. 278)	Babol	MAZ	—	—	—	*pipistrellus*	—	
Lay (1967, p. 142)	Sama	MAZ	2	1♀	22 Aug. 1962	*pipistrellus*	FMNH 96440	Adult mistnetted over small pool.
	8 km. N Gorgan	MAZ	3	1♀	29 Oct. 1962	*pipistrellus*	FMNH 96444	Attempts to net over a lagoon failed but "... shooting by spotlight produced a number of individuals, the majority of which proved unfit for preparation..."
	4.8 km. W Pahlavi Dezh	MAZ	9	2♀ 7 ?	31 Oct. 1962	*pipistrellus*	FMNH 96445-6; 98395-401	Six mummies, one skull only. Found in attics beneath tin roofs on buildings.
	Barfurush (=Babol)	MAZ	10	2♂ 6♀ 1 ?	6-7 July 1927	*pipistrellus*	BM 27.10.26.6-8; 27.10.26.10; 27.10.26.12-16	"House of Imperial Bank of Persia." Three adult females, rest immature, one prevolant.
	Gombad-i-Kabous (=Gonbad-i-Kavus)	MAZ	4	2♂ 2♀	27 June 1952	*pipistrellus*	SMNS 4052-5	All adults.
Etemad (1969, p. F. 175)	Kazerun	FAS	1	1♀	—	*aladdin*	—	Reported as *P. kuhli*.

Table 19. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
Farhang-Azad (1969, p. 731)	Loft-abad	KHR	123	56♂ 65♀	July, 1968	*aladdin*	IPHR 5 uncat.	"Collected from the ceiling of an old fort." No embryos in females.
	Hessar near Loft-abad	KHR	2	2♂	July, 1968	*aladdin*	—	Mistnetted.
Farhang-Azad (1970)	Siahkal	GIL	2	1♂ 1 ?	15 June and 16 July 1969	*pipistrellus*	IPHR 160; 1 uncat.	
	Chelmir	KHR	69	8♂ 16♀	12 and 13 July 1969	*aladdin*	IPHR 590; 592-609; 611-14; 644	Six adult females, nine immature females and eight immature males.
	71 km. SE Meshad (=Mashhad)	KHR	8	3♂ 5♀	3 July 1969	*aladdin*	IPHR 1033-40	
Neuhauser and DeBlase (1971, p. 279)	8 km. NW Kuh Rang	CMB	7	3♂ 2♀	25 and 26 Sept. 1968	*aladdin*	FMNH 111394-400	Shot over broad, treeless stream valley at 8500 ft. elev.
	Sar Dasht village SW of Lordegan	CMB	1	1♂	1 Oct. 1968	*aladdin*	FMNH 111401	Shot over jube in valley at 7000 ft. elev.
	Shahpur Cave	FAS	1	1 ?	9 Oct. 1968	*aladdin*	FMNH 111599	Skull and portion of skin only. Shot from roost at tip of small stalactite high in a room of the cave. In torpor. Adult.
	Jahrom	FAS	1	1♂	9 Nov. 1968	*aladdin*	FMNH 111455	Shot as it flew in orange grove. Adult.
	Ilam	ILA	1	1♂	1 Sept. 1968	*aladdin*	FMNH 111466	Mistnetted in grove of large old trees in garden in town. Adult.

Table 19. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Subspecies	Specimens Examined	Remarks/ Ecological Notes
Neuhauser and DeBlase (1971, p. 279)	6.4 km. N Kermanshah	KRS	4	1 ♂ 3 ♀	20 and 21 August 1968	*aladdin*	FMNH 111402-4	Shot as they flew above trees along stream at dusk.
	7.2 km. N Kermanshah	KRS	9	1 ♂ 8 ♀	22 Aug. 1968	*aladdin*	FMNH 111405-13	Found behind sign over door of school in village.
	1.6 km. S Khurramabad	LOR	1	1 ♀	9 Sept. 1968	*aladdin*	FMNH 111379	Mistnetted in poplar grove along Kashkan river. Adult.
	Derbent (=Darband) 50 miles W Isfahan (6500 ft.)	ESN	1	1 ♂	14 May 1905	*aladdin*	BM 5.10.4.13	Holotype of *P. aladdin* Thomas 1905. "Shot among poplar trees near the village."
	Shiraz	FAS	6	3 ♂ 3 ♀	7 July to 8 Aug. 1919	*aladdin*	BM 20.2.9.12-17	Reported as *P. mimus* by Cheesman (1921, p. 576). All immature.
	Maku	WAZ	2	1 ♂ 1 ♀	3 Oct. 1962	*aladdin*	FMNH 96442-3	Reported as *P. kuhli* by Lay (1967, p. 143). "Large numbers flew over the Zangamar River nightly at Maku."
Felten (in press)	Rafsanjan	KRM	1	1 ♂	1972	*aladdin?*	—	SMF 46397 (Felten, pers. comm., 1975)
New Records	Tir Tash	MAZ	58	13 ♂ 45 ♀	20 Aug. to 7 Sept. 1970	*pipistrellus*	MMTT 4 uncat. BM 71.1666-719	From building and grounds of Tobacco Institute.
	28 km. W Gorgan	MAZ	2	1 ♂ 1 ♀	12 and 14 June 1963	*pipistrellus?*	USNM 340976; 340982	Both prevolant.
	3 km. SW Dasht	MAZ	1	1 ♀	17 May 1963	*pipistrellus*	USNM 340975	

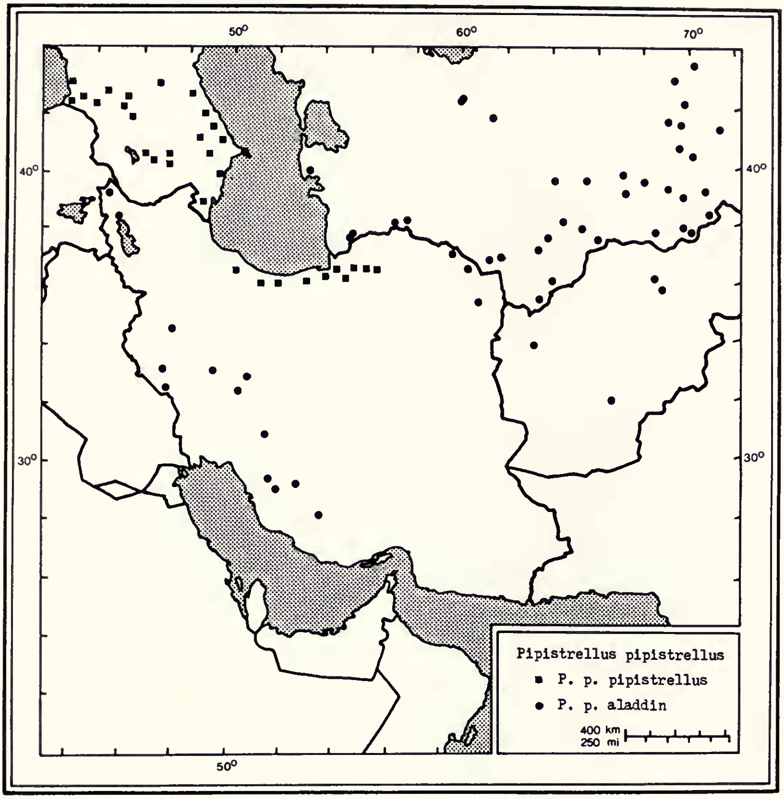

FIG. 117. Distribution of *Pipistrellus pipistrellus.*

kuhli. These two localities are therefore listed under that species rather than for *P. pipistrellus*.

Subspecies:

Pipistrellus pipistrellus pipistrellus (Schreber) (see above)

Pipistrellus pipistrellus aladdin Thomas

Pipistrellus aladdin Thomas, 1905, Abstract, Proc. Zool. Soc., London, no. 24, p. 23; 1906, Proc. Zool. Soc., London, **1905**(2), p. 521.

Type Locality.—Derbent (=Darband), 6,500 ft., Iran.

Holotype.—An adult male skin, skull and baculum, BM 5.10.4.13, "Shot among poplar trees near the village," on 14 May 1905.

Range.—Soviet Central Asia, western China, Afghanistan, and

Iran except for the Caspian coastal region and adjacent slopes of the Elburz Mountains.

Neuhauser and DeBlase (1971) have shown that the form *aladdin* Thomas, 1905, is synonymous with *P. p. bactrianus* Satunin, 1905, and that the former has priority. The nominate form, *P. p. pipistrellus*, occurs through the north slope of the Elburz Mountains and the adjacent Caspian coastal plain. *Pipistrellus p. aladdin* has been collected in the Zagros Mountains from Maku in the north to Jahrom in the south and from several localities in northeastern Iran (fig. 117). It very likely also occurs through the area south of the Elburz Mountains divide and may occur east of the central deserts as well.

Specimens Examined:

In addition to the Iranian specimens for which catalog numbers are given in Table 19, I have examined all of the specimens from Afghanistan, the USSR, Kashmir, Lebanon, and Turkey that are listed by Neuhauser and DeBlase (1971a, pp. 279-280) and four specimens of *P. p. mediterraneus* from Marbella-Fuengirula, Magala, Spain (HZM 64.2442-67.2445).

Ecological Notes:

On 22 August 1968 a group of boys sold us one male and eight female *P. p. aladdin* at our camp at Kermanshah. At my request they took us to their village and pointed out a sign over the door to the schoolhouse (fig. 118). According to the boys, the bats had been roosting in the slight space between the 1 ft. x 2 ft. sign and the adobe wall of the building to which it was attached. No bats were present when I looked and no guano was visible in the area. Other villagers said bats could be found in the cracks in their door jambs. I found none in the ones I examined.

At Ilam we were told that bats roosted in the hollows of large trees in a grove in a garden in the city. We saw no droppings around the trees and could not get up to the hollows. We set up a mistnet and on 1 September 1968 collected one adult male. Many other bats were visible flying about the garden, but they managed to avoid our net. We saw no bats fly in or out of the hollows, but visibility was poor in the grove at dusk.

The Tir Tash series was collected from the building and grounds of the Tobacco Institute over a period of days. Between 20 August and 4 September four males and six females were netted or otherwise

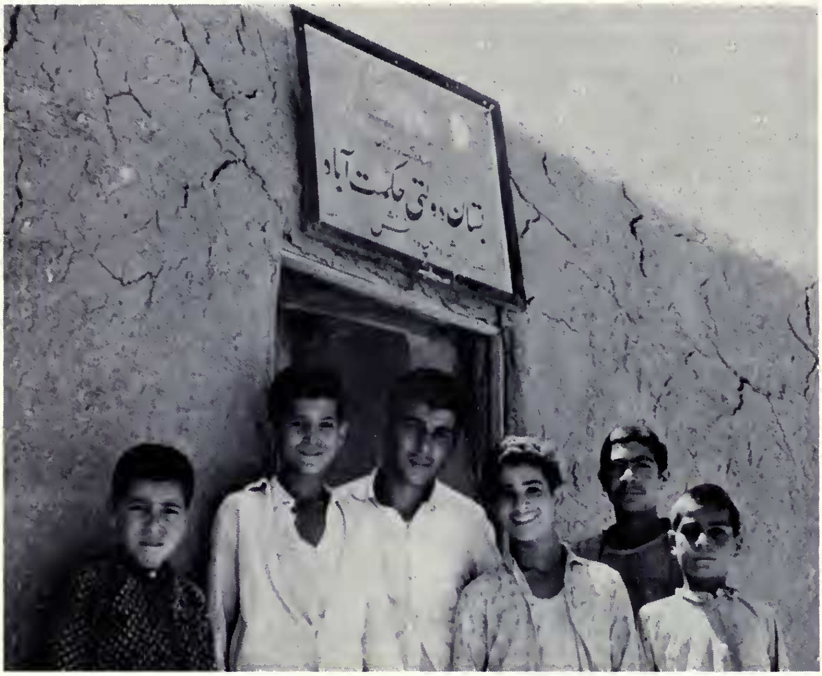

FIG. 118. Village schoolhouse north of Kermanshah. These boys collected a colony of *Pipistrellus p. alladin* from behind the sign above the door.

collected from the gardens and hedgerows. On 7 September nine males and 36 females were collected from their roost in the loft of a Tobacco Institute building.

Nursery colonies of *P. p. pipistrellus* have been found in buildings in Iran in early July (Babol) and early September (Tir Tash) but were essentially empty of live bats in late October (Pahlavi Dezh). Immature *P. p. aladdin* were present in Shiraz on 7 July. An adult male was found in torpor in a cave on 9 October, but another adult male was found flying at dusk in Jahrom on 9 November.

Pipistrellus kuhli (Kuhl)

Vespertilio kuhlii Kuhl, 1819, Ann. Wetterau. Ges. Gesammte Naturk., 4, 2, p. 199.

Type Locality.—Trieste, Italy.

General Range:

Cape Province north to the Mediterranean coast (Hayman and

Hill, 1971, p. 40). Europe from Portugal to Greece and north to central France (van den Brink, 1968, p. 63). Turkey (Çağlar, 1965, pp. 131-132). Most of the Arabian Peninsula (Harrison, 1964, p. 152; Nader, 1975, p. 339). The Crimean Peninsula, Transcaucasia, and one locality south of the Aral Sea in Uzbekhistan (Bobrinskii et al., 1965, Map 32). Afghanistan (Gaisler, 1970, p. 46). Pakistan (Siddiqi, 1969; Roberts, 1977, p. 73). Kashmir (Ellerman and Morrison-Scott, 1951, p. 168).

Iranian Distribution:

Specimen and literature records of *P. kuhli* from Iran are listed in Table 20 and mapped in Figure 119. Farhang-Azad (1971) reported *P. pipistrellus* from 20 km. W Tabus (=Tabas) and from Salehabad (=Sahlabad), 130 km. S Birjand. I have identified three of his specimens from these localities as *P. kuhli* and thus include both localities on the list for this species, instead of for *P. pipistrellus*. Lay (1967, p. 143) reported two specimens from Maku that were subsequently shown to be *P. pipistrellus* (Neuhauser and DeBlase, 1971A, p. 279). Etemad (1967, p. 278) reported *P. kuhli* from Kazerun. However, based upon his description of the very narrow white wing margin on this specimen (Etemad, 1969, p. F175), I have also referred it to *P. p. aladdin*.

Pipistrellus kuhli is the best known and perhaps most widely ranging bat in Iran. It has been reported from numerous localities east, south, and west of the central deserts and from three points in the north. However, it is conspicuously absent from northern Khorasan Province and, except for the Lake Rezaiyeh and Tabriz specimens, from northwest Iran as well. Both of these are areas that have been relatively well collected and from which *P. kuhli* could be expected to occur in view of its distribution in the USSR. This species should not occur along the Caspian coastal plain, but Robert Tuck found a fresh dead specimen in the street at Bandar-e-Pahlavi on the early morning of 10 May 1974. It is highly likely that this had been carried into the area by a vehicle coming over the mountains from the south.

Subspecies:

Pipistrellus kuhli lepidus Blyth

Pipistrellus lepidus Blyth, 1845, Jour. Asiat. Soc. Bengal, 14, p. 340.

Type Locality.—Kandahar, Afghanistan.

Pipistrellus kuhli, like *P. pipistrellus* and several other bat

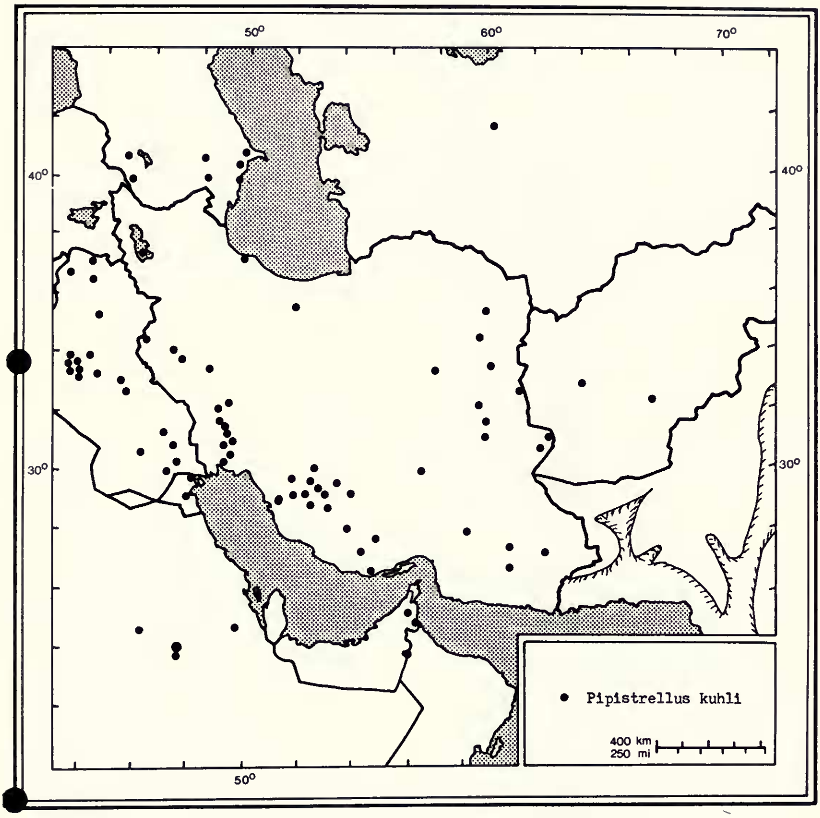

FIG. 119. Distribution of *Pipistrellus kuhli.*

species, has a much lighter color in the arid regions of central and southwestern Asia than it does in Europe. *Pipistrellus lepidus* Blyth, 1845, is generally considered to be a subspecies of *P. kuhli*. Bobrinskii et al. (1965, p. 109) listed *P. k. lepidus* as the form from the Caucasus and central Asia. Gaisler (1970, p. 47) listed *P. k. lepidus* from Iraq, Iran, Afghanistan, and Pakistan. Harrison (1964, p. 152), however, considered all specimens of this species from the Arabian Peninsula, including those from Iraq, to be *Pipistrellus kuhli ikhwanius* Cheesman and Hinton, 1924. Gaisler et al. (1972, p. 24) considered North African specimens to be *P. kuhli marginatus* Cretzschmar, 1830. Both of these latter forms are also distinguished from *P. k. kuhli* on the basis of lighter color. Comparisons of the three light forms, *lepidus, ikhwanius,* and *marginatus*, are absent from the literature. It is likely that these three are synonymous, but

TABLE 20. Records of *Pipistrellus kuhli* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
De Filippi (1865, p. 343)	"Southern Persia"	?	—	—	—	—	
Dobson (1871, pp. 460-1)	Shiraz	FAS	—	—	—	—	
Blanford (1876, p. 23)	Bampur	SAB	1	—	—	—	
	Karman (= Kerman)	KRM	2	1♂	1872	BM 74.11.21.27	
	Niriz (= Neyriz), E Shiraz	FAS	1	1♀	1872	BM 74.11.21.28 (skin) BM 74.11.28.28 (skull)	
	"Southeastern Persia"	?	2	—	—	—	
Thomas (1905, p. 520)	Ahwaz (= Ahvaz) (220 ft.)	KHU	5	5♂	28 Feb., 1 March, and 28 March 1905	BM 5.10.4.7-11	"Shot flying over the river" "Common in the town."
	Dizful (= Dezful) (500 ft.)	KHU	1	1♀	11 March 1905	BM 5.10.4.12	"Shot . . . by a house near the river."
Thomas (1907, p. 196)	Tehran (4600 ft.)	CEN	1	1♂	15 April 1907	BM 7.7.14.3	
Satunin (1909, p. 31)	Badzhistan (= Bejestan)	KHR	4	—	17 April 1896	—	
	Nusi	KHR	8	—	13 April 1896 6 Aug. 1899	—	
	Izmailabad (= Esmailbad)	KHR	4	—	12 June 1896	—	
	Meigun	KHR	1	—	16 May 1896	—	
	Nasrieh (= Ahvaz)	KHU	1	—	8-9 Jan. 1904	—	
	Kirman (= Kerman)	KRM	4	—	1901	—	

Table 20. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Cheesman (1920, p. 327)	Shuster (= Shushtar)	KHU	1	—	21 Jan. 1918	—	Immature
Wroughton (1920, p. 316)	Nag	SAB	3	2♂ 1♀	—	FMNH 82746	Immature
Cheesman (1921, pp. 574, 576)	Kamarij, Dashistan (= Kamaraj)	FAS	1	1♀	17 June 1902	BM 2.10.1.4	
	Shiraz (5200 ft.)	FAS	1	1♀	3 May 1902	BM 2.10.1.3	
	Shiraz (5200 ft.)	FAS	14	14♀	16 April - 21 July 1919	BM 20.2.9.6-11	
Werner (1929, p. 238)	Tagiabad (= Tagiabad-e Shadan)	KHR	1	—	—	—	
Lay (1967, p. 143)	Faraman	KRS	1	1♂	23 Jan. 1963	FMNH 96745	"Flew into our preparation room via an open window and lit on the wall shortly after nightfall."
	19.3 km. S Shush	KHU	1	1♂	17 Jan. 1963	FMNH 96744	"Flew over and around the Karkheh River and ox-bow lakes."
	Ahram	BSH	3	2♂ 1♀	9 and 11 Jan. 1963	FMNH 96741-3	"Flying about the date groves."
	5 km. SE Pol-i-Abgineh, Lake Famur	FAS	31	6♂	27-29 Dec. 1962	FMNH 96721-34; 96736-7; 96746-59; 98402	"Fed on insects at dusk" "by day . . . took refuge in small caves in surrounding mountains" "rarely more than one or two individuals occupied the same chamber."

TABLE 20. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Lay (1967, p. 143)	Shahpur Cave	FAS	3	3♂	29 Dec. 1962	FMNH 96738-40	"Six to eight hung separately in the hot chamber . . . loosely associated with *Myotis capaccinii.*"
	Bandamir (= Band-e Amir)	FAS	1	1♀	1 July 1920	BM 25.10.4.4	
	Jarghun (= Zarghum ?) 52°44′E 29°48′N (5150 ft.)	FAS	1(2)	2♀	3 and 4 July 1920	BM 25.10.4.1-2	
	Jiroft	KRM	2	1♂ 1♀	5 May 1956	SMNS 5055-6	Both immature specimens.
	Iranshahr	SAB	1	1♀	21 April 1951	BM 52.1467	
	"Seistan"	SAB	1	?	—	BM 8.1.13.1	
Etemad (1969, p. F. 175)	Zabol	SAB	1	1♂	Winter, 1967	—	
	Konar-Takhteh	BSH	1	1♀	Spring, 1966	—	
Farhang-Azad (1971)	3 km. to Shushtar	KHU	3	2♂	10 and 12 Sept. 1970	IPHR 3311; 3472-3	
	Darkhwein (= Darkhovin) 45 km. N Abadan	KHU	2	2♀	15 Sept. 1970	IPHR 3479; 3553	
	20 km. W Tabus (= Tabas)	KHR	1	1♂	24 Oct. 1970	IPHR 3924	Reported as *P. pipistrellus.*
	Salehabad (= Sahlabad) 130 km. S Birjand	KHR	12	?	28 Oct. 1970	IPHR 3961-2	Reported as *P. pipistrellus.*
Felten (in press)	Rafsanjan	KRM	1	1♀	21 April 1974	—	SMF 46398 (Felten, pers. comm., 1975).
	Tabriz	EAZ	1	1♂	Fall, 1970	—	SMF 47843 (Felten, pers. comm., 1975).

TABLE 20. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
New Records	6.4 km. N Kermanshah	KRS	1	1♀	20 Aug. 1968	FMNH 111467	Shot over camp with *P. p. aladdin.*
	1.6 km. S Khurramabad	LOR	2	2♂	9 and 10 Sept. 1968	FMNH 111380; 111382	One taken in mistnet set in poplar grove with *P. p. aladdin.* Other shot over Kashkan River adjacent to grove.
	Meshrageh	KHU	1	1♂	19 Oct. 1968	FMNH 111414	Shot over and along the Jahari River.
	Shush	KHU	41	8♂ 33♀	24 Oct. 1968	FMNH 111415-54	Collected from straw matting in roof of flour mill. About 250 present.
	Persepolis	FAS	6	1♂ 5♀	4 Oct. 1968	FMNH 111469-73; 111498	Shot as they flew over fountain/pond in garden adjacent to ruins. Also *E. nasutus.*
	Shiraz area	FAS	5	1♂ 3♀ 1?	6-7 Oct. 1968	FMNH 111474-8	See "Ecological Notes" section.
	Jahrom	FAS	1	1♂	11 Nov. 1968	FMNH 111456	Shot in garden at dusk.
	Jahrom	FAS	11	3♂ 7♀ 1 ?	8 Nov. 1968	FMNH 111479-83; 111485-90	Collected from cracks in plaster of mosque garden walls.
	3.2 km. W Jahrom	FAS	7	3♂ 4♀	8 Nov. 1968	FMNH 111491-7	Shot flying over road at dusk.
	Bastak	COS	2	2♀	20-21 Oct. 1968	FMNH 111457-8	Shot in garden at dusk.
	Chah Moslem	COS	7	2♂ 4♀ 1 ?	21-25 Nov. 1968	FMNH 111459-65	Shot flying over barren fields.

Table 20. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
New Records	Shiraz	FAS	1	1♀	18 June 1920	BM 25.10.4.3	
	Tehran	CEN	2	1♀ 1 ?	1906	BM 67.2304-5	
	"Foot of Elburz, S. E. Caspian"	MAZ	2	2♂	—	BM 10.8.12.3-4	
	Dezful	KHU	1	1♀	19 June 1973	—	Specimen in collection of Iran Dept. of Environment (Lay, pers. comm., 1973)
	Quyon Daghi Island, Lake Rezaiyeh	EAZ	1	1♀	14 Sept. 1969	MMTT 240	
	26 km. E Haft Tappeh	KHU	2	1♂ 1♀	15 and 17 May 1969	MMTT 241, 243	♀"taken from barn roof." ♂barely volant immature "shot near village over wheat field."
	Bandar-e-Pahlavi	GIL	1	1♀	10 May 1974	MMTT uncat.	Found dead in street in early morning. (Probably not native to this locality.)
	8 km. E Qasr-e Shirim (= Qasr-i-shirin)	KRS	3	2♂ 1♀	15 and 16 April 1964	USNM 350143-5	
	13 km. SE Shiraz	FAS	1	1♂	3 July 1965	USNM 369542	
	3 km. N Durna (= Duruh)	KHR	2	1♀	26 Aug. 1962	USNM 326706	
	5 km. NE Isfehdeh (= Esfideh)	KHR	5	1♂ 4♀	8 and 9 Nov. 1962	USNM 327991-5	
	4 miles N Lar	FAS	2	1♂ 1♀	28 July 1965		USNM 375190-1

a detailed comparison has not been made. Gaisler et al. (1972, p. 24) determined that "it is impossible, for the time being, to synonymize the typical *P. kuhli ikhwanius* nor, for zoogeographical reasons, *P. kuhli lepidus*" with *P. k. marginatus*.

Etemad (1969, p. F174) referred specimens from the north and west of Iran to *P. k. kuhli* and those from the east and southeast of Iran to *P. k. lepidus*. Harrison (1964, p. 151) observed that "Lewis and Harrison (1962) have demonstrated the existence of a geographical cline in the color of the membranes and pelage between the typical race in southern Europe and the pallid desert race." The many specimens of *P. kuhli* now known from Morocco to Afghanistan must be compared to determine the correct relationship of the four subspecies discussed above. Until this is done I follow Gaisler (1970, p. 46) in provisionally designating all Iranian specimens as *P. k. lepidus*.

Specimens Examined:

I have examined all Iranian specimens for which catalog numbers are listed in Table 20. In addition I have examined 30 from Afghanistan (FMNH 102640-6, 102650-72), two each from Pakistan (FMNH 82745, BM 64.1198) and Lebanon (FMNH 99564-5), and one each from Iraq (BM 93.6.25.5) and Israel (Univ. of Florida Collection 5171).

Ecological Notes:

Ecological information on this species in Iran is summarized in Table 20. On specimen tags of the Ahvaz specimens reported by Thomas (1905, p. 520) the collector, R. B. Woosnam, has noted that these bats were "plentiful near houses" and "common in the town." Although he apparently found the bat abundant in March, only males were collected. All of these bats were shot as they flew about the town or over the river in town. Cheesman (1921, p. 576) on the other hand, in reporting 14 females collected at Shiraz on 17 June, remarked that "the large proportion of females to males in collections of Pippistrels [sic] is remarkable. Buxton obtained one male to 16 females in a series of *P. kuhli* in Amara," Iraq. Harrison (1964, p. 155) listed 14 female *P. kuhli* from Amara collected in March and April 1918 and two males from that locality, one collected on "29.1.18" (a misprint of the month?) and one on 28 March 1918.

On 24 October the 1968 Street Expedition located a colony of approximately 250 *P. kuhli* in the straw "under roof" of a high-ceilinged, rather dark room in a flour mill at Shush. We used aerosol cans of insecticide to drive the bats out of the straw and collected 40 specimens with large butterfly nets as the bats flew around the room. This sample included 33 females but only seven males.

On 7 October the 1968 Street Expedition visited a village just south of Shiraz where numerous holes under the eaves of buildings were pointed out as harboring bats. Just before dusk (5:40 P.M.) the sky above the village became filled with small bats that could be observed flying out of holes and cracks in nearly every building. We used an aerosol can of insecticide to flush three specimens out of one of these holes and into a hand net, and we found a mummified specimen above the door frame of another house. All four of these are females.

It is likely that the sexes of this species segregate during the summer with the females forming nursery colonies. It is probable that the Shush, Amara, and Shiraz (Cheesman, 1921, p. 576) series are from such maternity colonies, whereas Woosnam's specimens and those collected by Lay at Lake Famur and Shahpur Cave are from "bachelor" areas.

Etemad (1969, p. F175) stated that this species is usually found in groups of three to five or even 20 and usually inhabits cracks between bricks, around windows, and under roofs. He said that at night they usually fly later than other species of *Pipistrellus*, with the immatures feeding around houses but the adults flying out of the cities to feed. He placed time of birth in mid-to-late spring with a usual litter size of two.

Although more specimens of *P. kuhli* are known from more localities in Iran than any other bat species, little is known of its ecology in this area. Most specimens have been shot as they flew about towns in the southern part of the country. They have been collected on the wing in this region in all seasons of the year. Several samples have greatly disproportionate sex ratios. Except for Lay's (1967, p. 143) observations of scattered individuals in "small caves" near Lake Famur and his record of the species from Shahpur Cave, *P. kuhli* has not been reported from caves in Iran. Barely volant specimens are known from Nag (21 June), Jiroft (5 May), and Haft Tappeh (15 May).

Pipistrellus savii (Bonaparte)

Vespertilio savii Bonaparte, 1837, Fauna Ital. I, fasc. 20.

Type Locality.—Pisa, Italy.

General Range:

Morocco, Algeria, Canary Islands, and ?Cape Verde Islands (Hayman and Hill, 1971, p. 39). Mediterranean Europe from southern Spain to Greece (van den Brink, 1968, p. 53). Tarsus, Turkey (Osborn, 1963, p. 216). Ainab, Lebanon (Harrison, 1964, p. 162). Crimea and from the Black Sea east to Tadzhikistan (Bobrinskii et al., 1965, Map 32). India (Neuhauser, 1970, p. 319). Afghanistan (Neuhauser and DeBlase, 1974). Mongolia, ?Sikkim, ?Assam, and ?Burma (Ellerman and Morrison-Scott, 1951, p. 169).

Iranian Distribution:

Farhang-Azad (1969, p. 731) reported seven specimens from Chelmir, Khorasan Province (IPHR 3 uncat.), and later (Farhang-Azad, 1970) reported 28 more from the same locality (IPHR 542-3, 624-5, 632-3, 636, 639, 641-2, 646, 667, 672, 711, 719). DeBlase (1971a) listed a specimen from 1 km. SE Maku (Zangamar River Cave), West Azarbaijan Province (FMNH 111468) and another from Sar Dasht village, SW Lordegan, Chahar Mahal and Bakhtari Province (FMNH 111381). On 11 November 1969 a female *P. savii* was mistnetted by Youton Botoloff on Quyn Daghi Island in Lake Rezaiyeh, East Azarbaijan Province (UMMZ 117578).

This species is now known from the extreme northwest, the extreme northeast, and the southwest of Iran (fig. 120). It probably occurs throughout the Zagros Mountains north of Shiraz and extends across the northern part of the country from Turkey to Afghanistan.

Subspecies:

Pipistrellus savii caucasicus (Satunin)

Vesperugo (Vesperus) caucasicus Satunin, 1901, Zool. Anz., 24, p. 462.

Type Locality.—Tiflis, Soviet Georgia (Bobrinskii, 1944).

Range.—Crimea, Caucasus, Soviet Central Asia, Afghanistan, Iran, Lebanon, Anatolia, and Cyprus.

Pipistrellus savii caucasicus Satunin, 1901, is recognized by Harrison (1964, p. 163) and Bobrinskii et al. (1965, p. 109) as the form that occurs in central and southwest Asia. They distinguished *caucasicus* from the nominate race by its lighter color, longer forearm (FA 33 to 37 mm. in *P. s. caucasicus* versus 31 to 33 mm. in

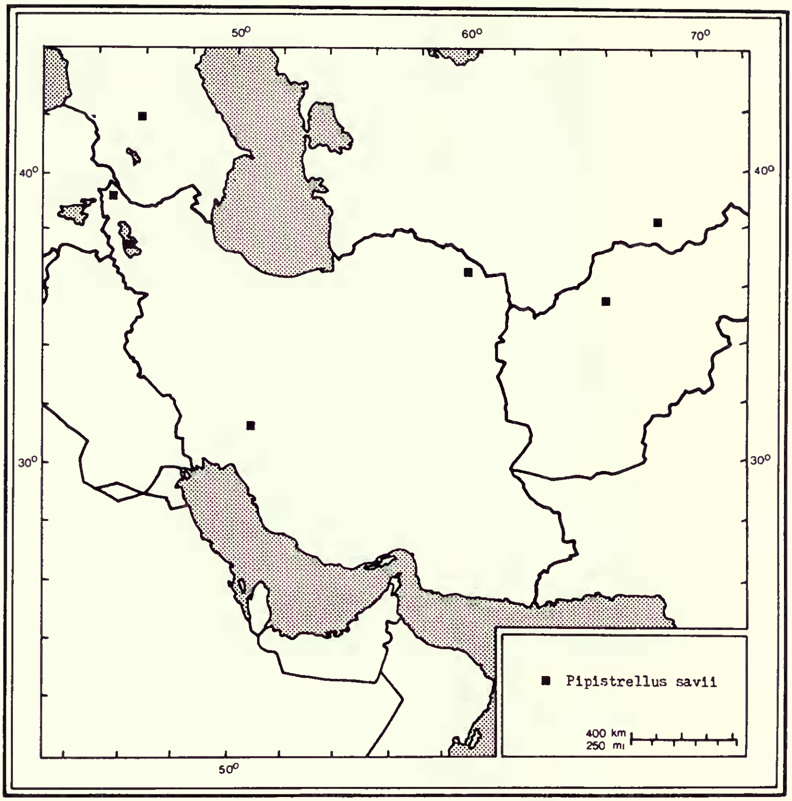

Fig. 120. Distribution of *Pipistrellus savii.*

P. s. savii) and shorter condylobasal length (CBL 12.5 to 13.7 mm. in *P. s. caucasicus* versus 13 to 14 mm. in *P. s. savii*). The color and measurements (Appendix I) of the Maku, Lake Rezaiyeh, and Sar Dasht specimens, and the measurements of specimens from Chelmir agree with those characteristics of *P. s. caucasicus*.

Specimens Examined:

I have examined the Iranian specimens for which catalog numbers are listed above as well as three specimens from Afghanistan (FMNH 102503, 102758, and 102762).

Ecological Notes:

Very little is known about the habits of this rather rare bat in Iran. The Maku specimen is an adult female, mistnetted at 10:00

P.M. on 28 July 1968 as it flew out of a cave near the Zangamar River about 1.6 km. E of town. It hung quietly in the net and did not move or make a sound. The Sar Dasht specimen is a male (perhaps a young of the year) shot on the evening of 1 October 1968 as it flew over a small jube in the mountain valley near the village. The Lake Rezaiyeh specimen is an adult female mistnetted on 11 November 1969.

The 1968 Chelmir specimens are two males and five females mistnetted over a stream in July (Farhang-Azad, 1969, p. 731). The portion of the 1969 series from this locality that I have examined includes five males and 10 females.

Barbastella leucomelas (Cretzschmar)

Vespertilio leucomelas Cretzschmar, 1826, *in* Rüppell, Atlas Reise nördl. Afrika, Säugeth. 73, pl. 28b.

Type Locality.—Arabia Petraea (=Sinai).

Lectotype.—Senckenberg Museum, Frankfort am Main. SMF 4373, Sinai; Lectoparatype SMF 12393 "Linares de Riofrio, Salamanca," Spain (Kock, 1969, p. 177).

General Range:

Senegal and ?Eritrea (Hayman and Hill, 1971, p. 46). Sinai and the "Coast of Arabia" (Harrison, 1964, p. 178). Turkey (Kumerloeve, 1975A, p. 91). Caucasia, Transcaucasia, and Soviet Turkestan (Bobrinskii et al., 1965, Map 27). Afghanistan (Meyer-Oehme, 1965; Neuhauser and DeBlase, 1974). Pakistan (Roberts, 1977, p. 75). China (Allen, 1938, p. 256). Japan (Wallin, 1969). Northern India and Indo-China (Ellerman and Morrison-Scott, 1951).

Iranian Distribution:

Barbastella leucomelas has been reported from Azad-Khan Cave near Mahallat (Etemad, 1964, p. 653) and from Tehran (Etemad, 1967, p. 278), both Central Province. Lay (1967, p. 147) reported a specimen from 2 km. NE Sang-e-Sar, Semnan Province. A specimen from Mohammed Reza Shah National Park, Mazandaran Province (MMTT 234) was collected in June, 1969.

In view of its distribution in the USSR, *B. leucomelas* could be expected to range across northern Iran (fig. 121). Since the Sang-e-Sar specimen has been shown to be *B. l. leucomelas* (Neuhauser and DeBlase, 1974), the form occurring in Sinai and Arabia, *B. leucomelas* could be expected to range through western Iran as well.

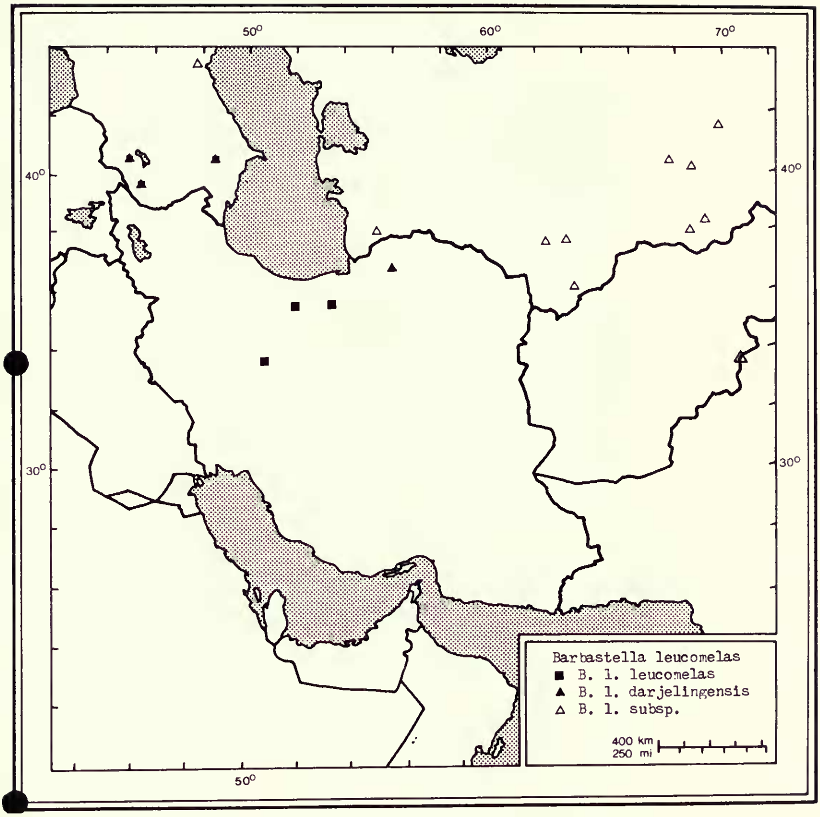

FIG. 121. Distribution of *Barbastella leucomelas.*

Subspecies:

Barbastella leucomelas leucomelas (Cretzschmar) (see above)

Barbastella leucomelas darjelingensis (Hodgson)

Plecotus darjelingensis Hodgson, 1855, *in* Horsfield, Ann. Mag. Nat. Hist., **16**, p. 103.

Type Locality.—Darjeeling, Northeastern India.

Range.—Ellerman and Morrison-Scott (1951, p. 176) give the range as "Caucasus, Transcaucasia, Russian Turkestan, . . . Chinese Turkestan . . . China; Hondo, Japan; Nepal, Punjab, Sikkim, Bhutan Duars, Rajputana . . . ; Indo-China." However, the central Iran specimens are the nominate form, as is the Kuzyakin specimen from

West Alai Settlement, Fzunse. Thus the Caucasus and Transcaucasia should be eliminated from the above range and NE Iran should be added.

Two subspecies of *B. leucomelas* are currently recognized: the nominate form from Arabia and *B. l. darjelingensis* Hodgson, 1855, from eastern Asia (fig. 122). Bobrinskii et al. (1965) refrained from designating a subspecies for *B. leucomelas* in the USSR, but his figure for this species (Bobrinskii et al., 1965, plate VII) is light colored like the nominate form. A specimen from West Alai settlement, Fzunse, USSR, (AKP uncat.) is *B. l. leucomelas*.

Neuhauser and DeBlase (1974) have shown that the Sang-e-Sar specimen is *B. l. leucomelas*. Etemad (1964, p. 653) described the Mahallat specimens as having "brown hairs with pale golden tip on the back and the whitish abdomen." This comment and his photograph of specimens from Azad Khan and Tehran (Etemad, 1969, p. F182) show his specimens are also *B. l. leucomelas*.

The Mohammed Reza Shah National Park specimen is identical in coloration to the *B. l. darjelingensis* reported from Kamu, Afghanistan (Neuhauser and DeBlase, 1974). Thus both forms are known from Iran.

Specimens Examined:

I have examined three *B. l. leucomelas*: the specimen from Sang-e-Sar, Semnan Province, Iran (FMNH 96766), a specimen from the "Coast of Arabia" (BM 7.1.7.346), and one from the USSR (AKP uncat.). In addition, I have examined eight *B. l. darjelingensis*: one from Iran (MMTT 234), one from Afghanistan (FMNH 102774), five from India (FMNH 48571, 84573, 82737-8; BM 54.9.1.13).

Ecological Notes:

Etemad (1969, p. F180) listed two males collected from a cave at Mahallat in spring and a male found in a home in Tehran in summer.

The Sang-e-Sar specimen is a female collected on 16 October 1962 from "an abandoned mine shaft that opened about 1000 ft. up the side of a steep mountain" (Lay, 1967, p. 147). It was very fat and contained no embryos.

The Mohammed Reza Shah National Park specimen is an adult

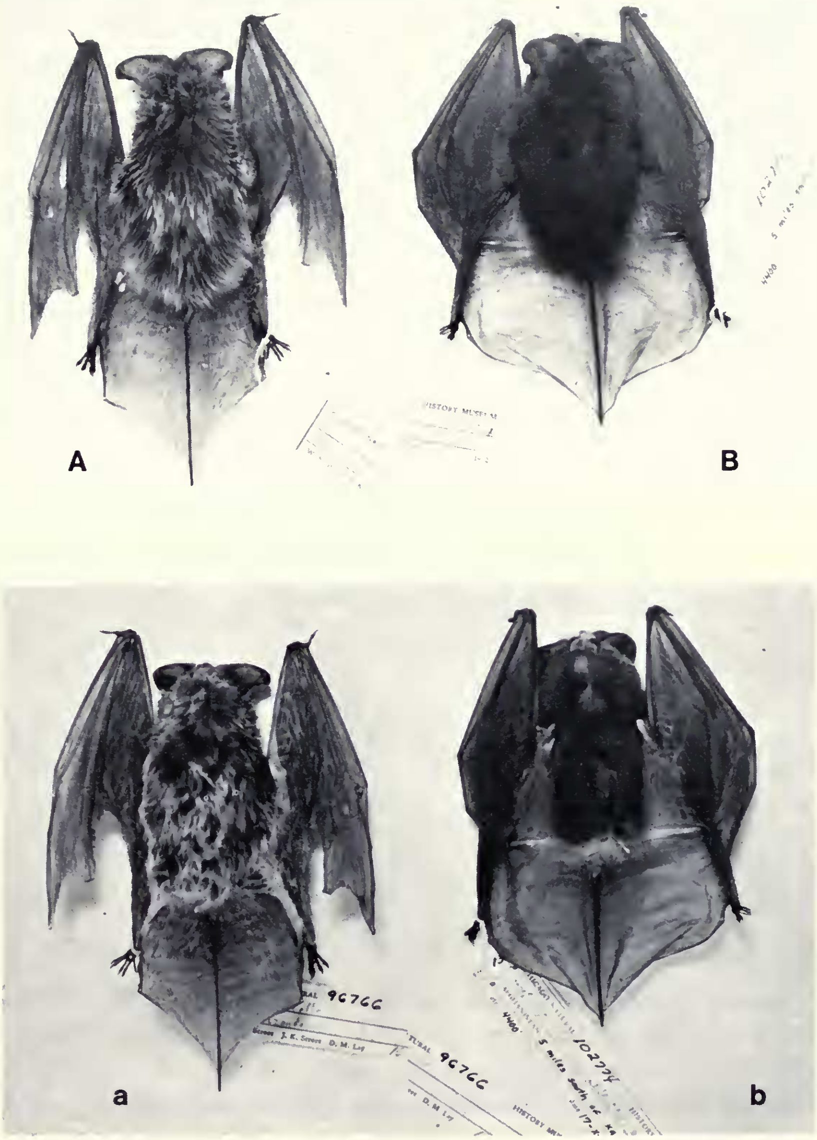

FIG. 122. *Barbastella l. leucomelas*, FMNH 96766 (**A**, dorsal; **a**, ventral) from Sang-e-Sar, Iran, and *B. l. darjelingensis*, FMNH 102774 (**B**, dorsal; **b**, ventral) from Kamu, Afghanistran (Neuhauser and DeBlase, 1974).

female collected in June 1969. The specimen tag bears the phrase "old fields." Kuzyakin's specimen was collected in a mine on 26 February 1970.

Bobrinskii et al. (1944, p. 89) said that in the USSR *B. leucomelas* is found in large caves that never contain more than three individuals. They mentioned only one record from other than a cave—in an ancient monastery. They also said that individuals of this species winter and summer in the same place.

Otonycteris hemprichi Peters

Otonycteris hemprichi Peters, 1859, Monatsb. Akad. Wiss. Berlin, p. 223.

Type Locality.—None given, "probably from some part of North-Eastern Africa" (Ellerman and Morrison-Scott, 1951, p. 180); restricted by Kock (1969, p. 215) to the Nile Valley between northern Aswan, Egypt, and Chondek, northern Sudan.

Type Specimen.—According to Dobson (1878, p. 182) "in the Berlin Museum."

General Range:

Algeria, Tunisia, Libya, Egypt, and Sinai (Hayman and Hill, 1971, p. 49). Sudan (Koopman, 1975, p. 416). Turkey (Kumerloeve, 1975A, p. 92). The southwestern Arabian Peninsula (Harrison, 1964, p. 174). Soviet Turkestan from the Caspian Sea to the western Pamir Mountains (Bobrinskii et al., 1965, Map 36). Northern Afghanistan (Meyer-Oehme, 1965, p. 50). Pakistan (Dobson, 1878, p. 182; Roberts, 1977, p. 80).

Iranian Distribution:

Satunin (1909) described the form *cinereus* from specimen ZMAS 5444 which he reported as being from Nukendzhaga (=Nauk-i-Jahan) village, Ge District, Persian Baluchistan. Ognev (1928, pp. 446-447) said that the specimen of *cinereus* recorded as ZMAS 5444 has a catalog entry corresponding to the data cited by Satunin (1909) but that:

> Unfortunately the correspondence of the data ends with this: "According to the register of 1901, this specimen originated from a different geographical area—Zurakkuh country, near the Bamrud irrigation ditch in Khurasan (21 July 1901)." Undoubtedly the Khurasan specimen is precisely that described by Satunin. Regrettably the author, due to some error, provided an incorrect site for the finding of *O. cinereus*.

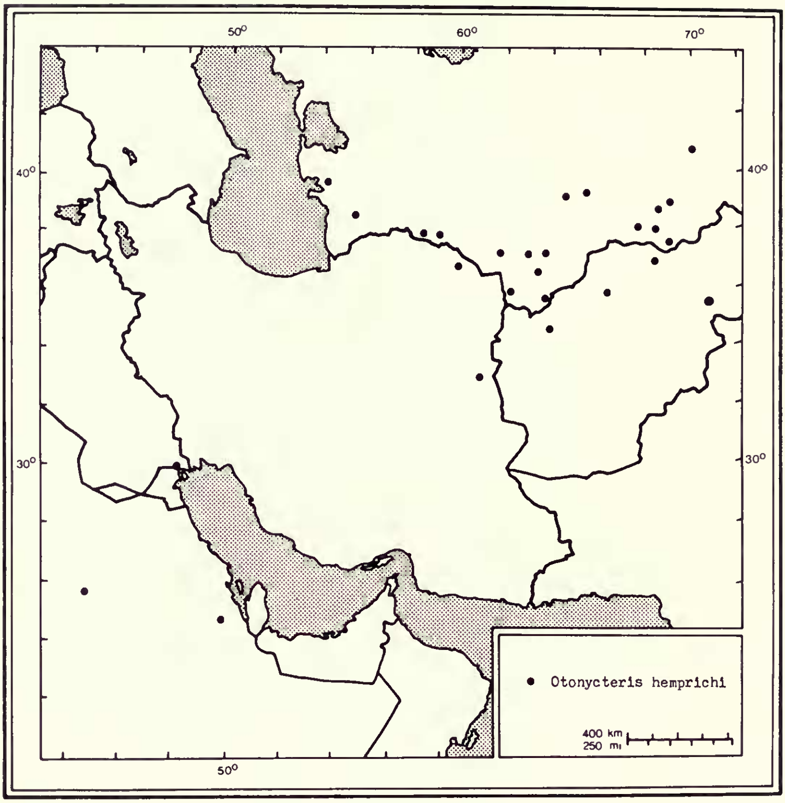

Fig. 123. Distribution of *Otonycteris hemprichi*.

Misonne (1959) and Lay (1967) reported Satunin's Baluchistan locality; however, Etemad (1969, p. E19) has accepted Ognev's emendation.

Farhang-Azad (1969, p. 731) reported five specimens mistnetted over a stream at Chelmir, Khorasan Province, and later (Farhang-Azad, 1970) reported 27 more specimens from the same locality. In view of the distribution of *O. hemprichi* in Iraq, Arabia, Turkestan, and northern Afghanistan, this arid land species could be expected throughout western and southern Iran (fig. 123).

Subspecies:

Ognev (1928, p. 582) regarded *O. cinereus* as a full species distinguishable by its darker color, longer ears, and larger dimensions. However, his indication of the geographic distribution of *cinereus* in relation to that of the nominate form is, at best, unclear. Ellerman and Morrison-Scott (1951, p. 180) tentatively listed *cinereus* as a valid subspecies but mentioned only the incorrect locality in Baluchistan for its distribution. They included Russian Turkestan and Gilgit in the range of the nominate form. Bobrinskii et al. (1965, p. 113) did not designate subspecies for the Soviet specimens. Neuhauser and Schlitter are now investigating the taxonomy of *Otonycteris*. Until this review has been completed, it is not possible to designate the subspecies of the Iranian specimens.

Specimens Examined:

I have examined 15 of the Chelmir specimens (IPHR 545-6, 629, 631, 634, 638, 640, 670-1, 713-4, 899, and 3 uncat.) as well as two from Afghanistan (FMNH 102765-6), one from Palestine (FMNH 44777), and two from Arabia (FMNH 48836, 48838).

Ecological Notes:

The Bamrud specimen is a female collected on 21 July 1901 (Ognev, 1928, p. 448). The 1968 Chelmir series consists of two males and three females mistnetted over a stream in July (Farhang-Azad, 1969, p. 731), and the portion of the 1969 series that I have examined includes nine males and four females collected between 15 and 17 July. According to Farhang-Azad (1969; pers. comm., 1974) none of the females contained embryos and all specimens were adults.

Plecotus austriacus (Fischer)

Vespertilio auritus austriacus Fischer, 1829, Synopsis Mammalium, p. 117.

Type Locality.—Vienna, Austria.

General Range:

Plecotus austriacus and *P. auritus* have only recently been shown to be sibling species (Hanak, 1966), and through much of their range the relative status of these two forms has not been clarified. Both are known from Europe, but apparently those from Africa and southern Asia are all *P. austriacus*. Gaisler (1970, pp. 49-50) reported the range for *P. austriacus* as: "Western, central and southern Europe ... Ukraine, Caucasus, Transcaucasia, and Soviet Central Asia; Asia Minor, Israel, Syria, Iran, Afghanistan, West Pakistan, Kashmir, Mongolia, western China, northern Africa ... probably also Abyssinia and northern Sudan (Harrison, 1964; Hanak, 1966)."

Iranian Distribution:

Peters (1866, p. 18) reported that *Plecotus* was collected in Iran by the Prussian Envoy, but no precise locality was given and no specimens were mentioned. Harrison (1963, pp. 305-306) reported three *Plecotus* from the Sulphur Caves at Guter-Su (=Kutur Su), north of Mt. Sabalan, East Azarbaijan Province (BM 63.1199-201), and Aberdeen University (1965, p. 6) reported three specimens from the Shah Abbas Caves, near Kuh Rang, Chahar Mahal and Bakhtiari Province (BM 66.3227-9). Etemad (1967, p. 278) reported a colony of this species in an old tomb at Hamadan, Hamadan Province. A recently collected specimen from the Sultanabad area, near Malayer in the Zagros Mountains, is in the collections of the British Museum (BM 74.25). Farhang-Azad (pers. comm., 1974) told me of a specimen in the Iran Public Health Research Collections that he collected at Nikshahr, Baluchistan. These localities are mapped in Figure 124. In view of its distribution in surrounding countries, *Plecotus austriacus* probably occurs in all of the mountainous portions of Iran.

Subspecies:

Etemad (1967, p. 278) used the name *P. austriacus wardi* Thomas, 1911, for his specimens from Hamadan, and Gaisler (1970, p. 50) and Meyer-Oehme (1965) both used this name for the *Plecotus* from Afghanistan. Harrison (1964, p. 178) assigned the specimens from the Arabian Peninsula to *P. austriacus christiei* Gray, 1838.

Bobrinskii et al. (1965, p. 99) did not recognize *P. austriacus* as a distinct species and listed four subspecies of *P. auritus* from the USSR: *P. a. auritus* from Europe to Caucasia; *P. a. sacrimontis* G. Allen, 1908, from East Asia; *P. a. wardi* from the Transcaspian region; and *P. a. macrobullaris* Kuzyakin (subsp. nov.) from the Caucasus. The relationships between these several forms is not yet clearly understood. It is impractical to designate subspecies of *P. austriacus* in Iran until this complex has been reviewed.

Specimens Examined:

In addition to the seven British Museum specimens from Iran that are listed above, I have examined the holotype of *Plecotus wardi* Thomas, 1911 (BM 6.10.3.2.).

Ecological Notes:

The Kutur Su specimens, all males, were found dead with several other species of bats in a cave on 21 August 1961. They had apparently been overcome by sulphur fumes (Harrison, 1963).

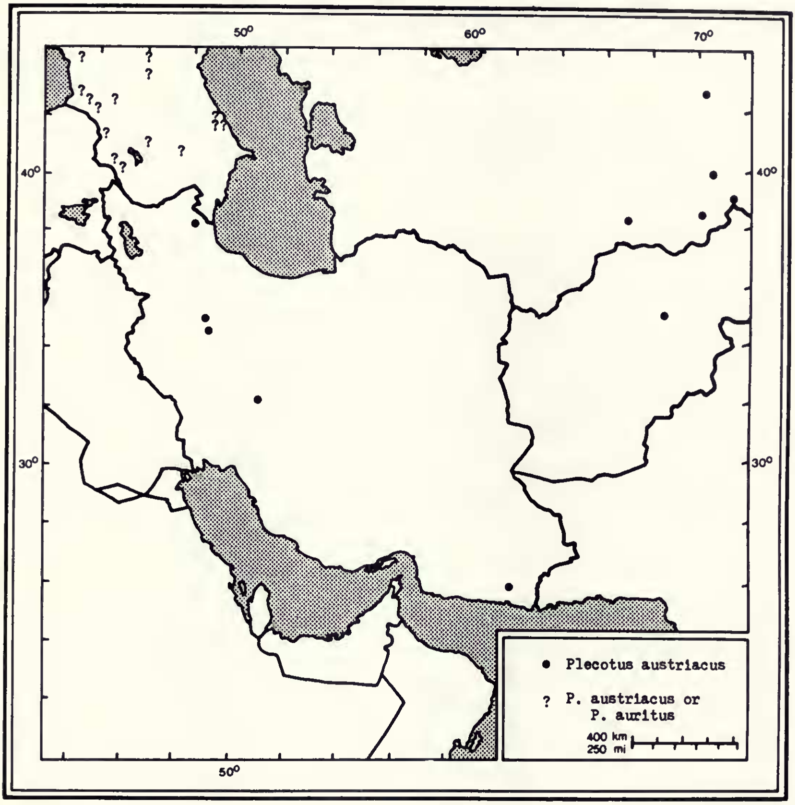

FIG. 124. Distribution of *Plecotus austriacus.*

The Kuh Rang series includes two females and one male collected in a cave. By ossification of the phalangeal epiphyses, the male is judged to be an immature, and one of the females may also be a young of the year. Unfortunately, these specimens are dated merely "1965."

The Hamadan specimens were collected from the tomb of Alivion during the summer of 1965. Etemad (1969, p. F192) gave measurements for two females and one of undetermined sex collected at this site and includes a photograph of the bats in this roost in a square brick tower.

The Sultanabad specimen is a male found "10 m. inside horizontal cave roosting singly on rock shelf" (specimen tag) by T. Booth on 31 August 1973.

Miniopterus schreibersi (Kuhl)

Vespertilio schreibersii Kuhl, 1819, Ann. Wetterau. Ges. Gesammte Naturk., 4, 2, p. 185.

Type Locality.—Kulmbozer Cave, mountains in SE Bannat, Hungary (now in Romania [Koopman, 1975, p. 417]).

General Range:

Morocco, Algeria, Tunisia, and most of sub-Saharan Africa (Hayman and Hill, 1971, p. 54). Southern Europe (van den Brink, 1968, p. 59). Turkey (Çağlar, 1965, p. 133). Iraq, Syria, Lebanon, Israel, and Jordan (Harrison, 1964, p. 183). The USSR southwest of the Carpathian Mountains, the Crimea, Caucasia, Transcaucasia, and the Kopet Dagh in southern Turkmeniya (Bobrinskii et al., 1965, p. 98). Afghanistan (Gaisler, 1970). China (Allen, 1938, p. 274). Japan (Wallin, 1969, p. 344). Formosa, Hainan, Ceylon, India, Nepal, Burma, Java, Borneo, Sumatra, Philippine Islands, New Guinea, and northern Australia (Brosset, 1962, p. 739).

Iranian Distribution:

Iranian records of *M. schreibersi* are listed in Table 21 and mapped in Figure 125. These records and its distribution in adjacent countries indicate that *M. schreibersi* ranges throughout the mountainous areas of western and northern Iran, and probably of eastern Iran as well.

Subspecies:

Miniopterus schreibersi pallidus Thomas

Miniopterus schreibersi pallidus Thomas, 1907, Ann. Mag. Nat. Hist., **20**, p. 197.

Type Locality.—Southern shore of Caspian Sea, Northern Iran. Near Bandar-e-Gaz (Lay, 1967, p. 147).

Holotype.—An adult female skin and skull, BM 7.7.14.7, collected on 25 March 1907.

Range.—Transcaucasia, Turkmenia, western Afghanistan, Iran, Iraq, Syria, Lebanon, Israel, Jordan, Anatolia, and Cyprus.

Lay (1967, pp. 148-150) reviewed the evidence that there is distinct seasonal variation in the color of *M. schreibersi* and concluded that the two lighter forms (*M. s. pallidus* Thomas, 1907, described from the southern shore of the Caspian Sea, and *M. s. pulcher* Harrison, 1956, described from Ser'Amadia, Kurdistan, Iraq) "represent

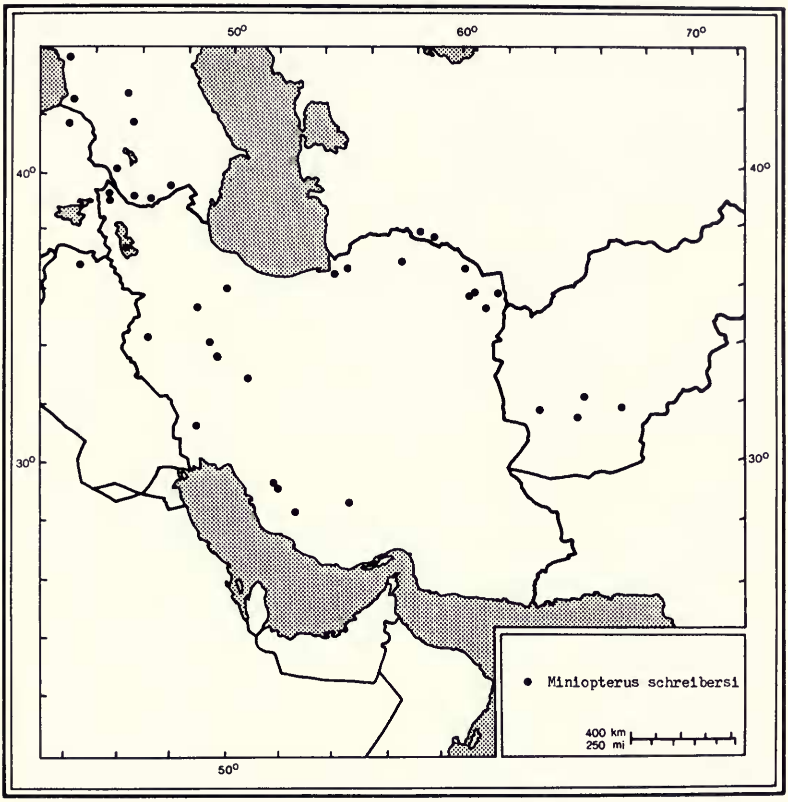

FIG. 125. Distribution of *Miniopterus schreibersi.*

different stages in the annual pelage color change of *M. s. schreibersi* Kuhl, and should be regarded as synonyms of it."

The color of the three specimens of *pulcher* is within the range of variation of *pallidus*, and even Harrison (1964, p. 182) agreed that the two forms should be synonymized. However, although color variations of the nominate form from Europe and of *pallidus* from southwest Asia overlap, the lightest *pallidus* are much lighter than the lightest of the nominate form and the darkest *pallidus* are not as dark as the darkest of the nominate form.

Lay (1967, p. 149) cited Kuzyakin (1950, p. 289) and "the authority on bats in Bobrinskii et al. (1944, p. 86) " as stating that "considerable seasonal variation occurs in the pelage of this species and that the color of the type *M. s. pallidus* is a result of fading." Yet

Table 21. Records of *Miniopterus schreibersi* in Iran

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Thomas (1907, p. 197)	"South Coast of Caspian" (vicinity of Bandar-e-Gaz)	MAZ	1	1♀	25 March 1907	BM 7.7.14.7	Holotype of *M. s. palidus*, (Type locality restricted by Lay [1967, p. 147]).
Etemad (1967, p. 274)	Azad Khan Cave, Mahalat (= Mahallat)	CEN	—	1♀	—	—	
	Moghan Cave, 30 km. N Messhad (= Mashhad)	KHR	52	1♀	—	—	
	Mozduran Cave, 110 km. E Messhad (Mashhad)	KHR	—	—	—	—	
	Alisard Cave, Kabutar-Ahand near Hamedan (= Hamadan)	HAM	—	1♂	—	—	
Lay (1967, pp. 147-8)	Ganjah Kuh Cave, 3 km. Jochdi	KHR	7	7♂	12 Nov. 1962	FMNH 96793-7; 98423-4	"had entered hibernation." About 45 hung "in a compact, unsegregated colony with *R. blasii*."
	8 km. N Gorgan	MAZ	1	1♂	31 Oct. 1962	FMNH 96792	Shot flying over lagoon at 9 p.m.
	Zangamar River Cave near Maku	WAZ	2	1♀ 1 ?	27 Sept. 1962	FMNH 96767-8	"a few roosted among many" *R. euryale* and *R. mehelyi*.
	Cave, 44 km. SE Maku	WAZ	31	18♂ 13♀	1 Oct. 1962	FMNH 96769-82; 98415-21	"Several hundred hung in clusters from the ceiling." "Active" and "exceedingly fat."

Table 21. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
Lay (1967, pp. 147-8)	Shahpur Cave	FAS	8	1♂ 5♀	29 Dec. 1962	FMNH 96799-804	Had entered hibernation. Hung mixed with *R. mehelyi*.
Farhang-Azad (1969, p. 732)	Moghan Cave, Mashad (= Mashhad)	KHR	46	21♂ 25♀	July 1968	—	"Mating at the time collected."
Farhang-Azad (1970)	Chelmir	KHR	1	1♂	16 July 1969	IPHR 698	Adult.
	20 km. W Meshad (= Mashhad)	KHR	36	14♂ 9♀	23 July 1969	IPHR 847-68; 870	
	71 km. SE Meshad (= Mashhad)	KHR	8	2♂ 5♀	29 July 1969	IPHR 1008-09; 1011-15	
Farhang-Azad (1971)	4 km. W Abhar	ZAN	44	11♂ 11♀	12 and 13 Aug. 1970	IPHR 2829-32; 2835; 2860-74; 2898-9	
Felten (in press)	Mozduran	KHR	15	8♂ 7♀	4 Oct. 1974	—	SMF 46663-76 (Felten, pers. comm., 1975).
New Records	5 km. SE Pol-i-Abgineh	FAS	6	2♂ 4♀	28 Dec. 1962	FMNH 96701; 96703; 96705; 96707; 96713; 96718	Originally reported as *Myotis capaccinii* by Lay (1967, p. 141). "Roosted in vertical well shaft."
	Gara Tarik (Cave), 4 km. N Qareh	KOR	26	11♂ 15♀	13 and 14 Aug. 1968	FMNH 111551-63; 111586-95	In torpor. About 5500 hung mixed with *M. blasii* and *R. mehelyi* and singly.
	Karaftu (Cave) near Dashbologh village, about 51.5 km. N Divandarreh	KOR	8	2♂ 6♀	16 Aug. 1968	FMNH 111564-71	In torpor. About 25 hung singly or in pairs.

Table 21. *continued.*

Source	Locality	Prov.	No.	Sex	Date Collected	Specimens Examined	Remarks/ Ecological Notes
New Records	River Cave (= Korie Cowat), Ravansar	KRS	17	8♂ 9♀	23 Aug. 1968	FMNH 111500-16	In torpor. About 1,000 hung singly or in pairs.
	Sarin Ab-Garma Cave, Dehloran	ILA	14	6♂ 7♀ 1 ?	5 Sept. 1968	FMNH 111572-84; 112523	Collected with handnet while flying in cave at dusk. Only one seen among 5,000 *A. tridens* and *R. microphyllum* roosting.
	Shahpur Cave	FAS	34	13♂ 20♀ 1 ?	9 Oct. 1968	FMNH 111517-50	In torpor. About 145 hung singly or in pairs.
	Chelmir	KHR	3	3♂	28 July 1968	IPHR 4 uncat.	
	Quyn Daghi Island, Lake Rezaiyeh	EAZ	1	1♂	6 Nov. 1969 [sic]	MMTT 235	"Shot near spring above lodge, much subcutaneous fat."
	Arac Langri, Malayer area	HAM	13	9♂ 4♀	25 Aug. 1973	—	20 m. inside cave (Hill, pers. comm., 1974) BM 74.26-38
	Alisard Cave, near Gol Tappen	HAM	9	3♂ 6♀	2 Sept. 1973	—	150 m. inside wet and muddy cave (Hill, pers. comm., 1974) BM 74.39-47
	11 km. NW Darab	FAS	1	1♂	11 July 1965	—	USNM 375189

Kuzyakin, as a co-author of Bobrinskii et al. (1965, p. 98), listed *M. s. schreibersi* as the form found in European Russia, the Crimea, and Caucasia, and *M. s. pallidus* as that found in Transcaucasia, Iran, and Turkmeniya.

Therefore, I must partially reject Lay's conclusions and retain *M. s. pallidus* as the appropriate name for this species in Iran.

Specimens Examined:

In addition to the Iranian specimens listed in Table 21, I have examined the holotype of *M. s. pulcher* (BM 67.1230) from Iraq, one specimen (FMNH 99568) from Lebanon, and 49 specimens (FMNH 102780-813), 102824-38) from four localities in Afghanistan.

Ecological Notes:

Except for the specimens shot at Gorgan and Lake Rezaiyeh, all Iranian *Miniopterus* for which collecting sites are known have been collected from caves (see table 20). Farhang-Azad (1969, p. 732) reported them as copulating in Moghan Cave in July; I found them active at a cave at Dehloran on 5 September; Lay (1967, p. 148) found them "exceedingly fat" but "active" at a cave near Maku on 1 October; and the Lake Rezaiyeh specimen was flying outside on 6 November. Lay did not note the time of day of his visit to the cave near Maku or to Ganjah Kuh Cave where he found them in torpor on 12 November. I visited the cave at Dehloran at dusk, but the caves where I found this species in torpor on 14, 16, and 23 August and 9 October were visited during the day. On each of these dates the ambient temperature in the vicinity of the caves was quite high and insects were plentiful. It is likely that these bats came out of these caves at night.

Gara Tarik contained very large quantities of guano. Karaftu contained smaller guano piles and Korie Cowat was filled with a large stream that probably concealed and flushed away considerable amounts of guano. It is probable that these caves, as well as Moghan Cave, contain nursery colonies. There is relatively little guano in Shahpur Cave and I thus conclude that this site is used primarily as a hibernaculum but not as a nursery.

10. FAMILY MOLOSSIDAE

Molossid bats in the Palearctic are characterized by a tail that extends well beyond the distal end of the short interfemoral membrane (fig. 126). This character is found only in these bats and in the Rhinopomatidae, which have a comparatively longer and much more slender tail. The ears of Iranian molossids are joined across the forehead, a small tragus is present, but there is no noseleaf (fig. 126). The wing is long and narrow with only a single rudimentary phalanx on the second digit. The skull has no postorbital processes and both the nasal and palatal branches of the premaxillary are present (fig. 127).

One genus, *Tadarida* Rafinesque, 1814, is represented in Iran by two species.

Key to the Species of Molossidae in Iran

1 Size smaller; forearm 45 to 55.5 mm.; condylobasal length 19.3 to 21.3 mm.; no more than two pairs of lower incisors .... *Tadarida aegyptiaca*

1′ Size larger; forearm 54.5 to 63.9 mm.; condylobasal length 22.5 to 24 mm.; three pairs of lower incisors .... *Tadarida teniotis*

Tadarida teniotis (Rafinesque)

Cephalotes teniotis Rafinesque-Schmaltz, 1814, Précis des decouvertes et travaux somiologiques de . . . , p. 12.

Type Locality.—Sicily.

General Range:

Southern Europe from Portugal east to Greece and north to Switzerland (van den Brink, 1968, p. 73). Egypt, Morocco, and Algeria (Hayman and Hill, 1971, p. 64). Lebanon, Israel, and Iraq (Harrison, 1964, p. 108). The Caucasus, Turkestan, and Uzbekistan in the USSR (Bobrinskii et al., 1965, Map 36). Afghanistan (Meyer-Oehme, 1965). India (Hill, 1964). China (Allen, 1938). Korea (Won, 1961). Japan (Wallin, 1969, p. 357).

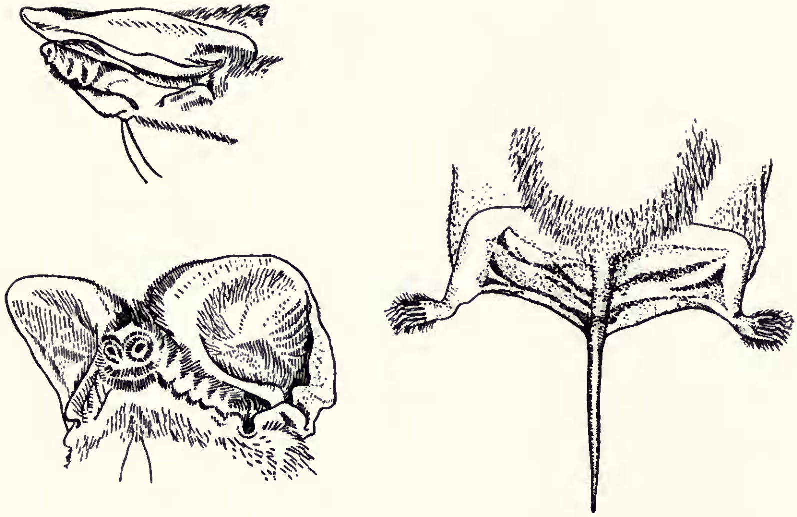

FIG. 126. Head and tail of *Tadarida teniotis* (Gromov, 1963).

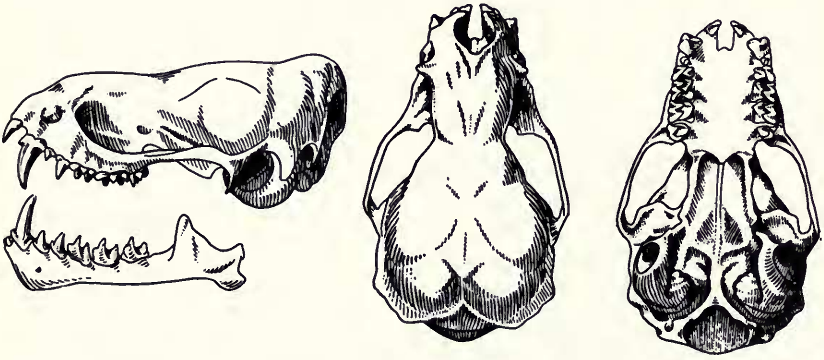

FIG. 127. Skull of *Tadarida teniotis* (Bobrinskii et al., 1965).

Iranian Distribution:

Trouessart (1904, p. 104) mentioned this bat from Persia but gave no locality or reference to a specimen. Lewis and Harrison (1962, p. 475) listed a specimen from "Bushire, Persia" (=Bushehr), Bushehr Province (BM 97.11.10.2) and another from the "Foot of the Elburz Mts. SE Caspian, Persia," probably Mazandaran Province (BM 10.8.12.5) Farhang-Azad (1970) listed four from Chelmir (IPHR 626,

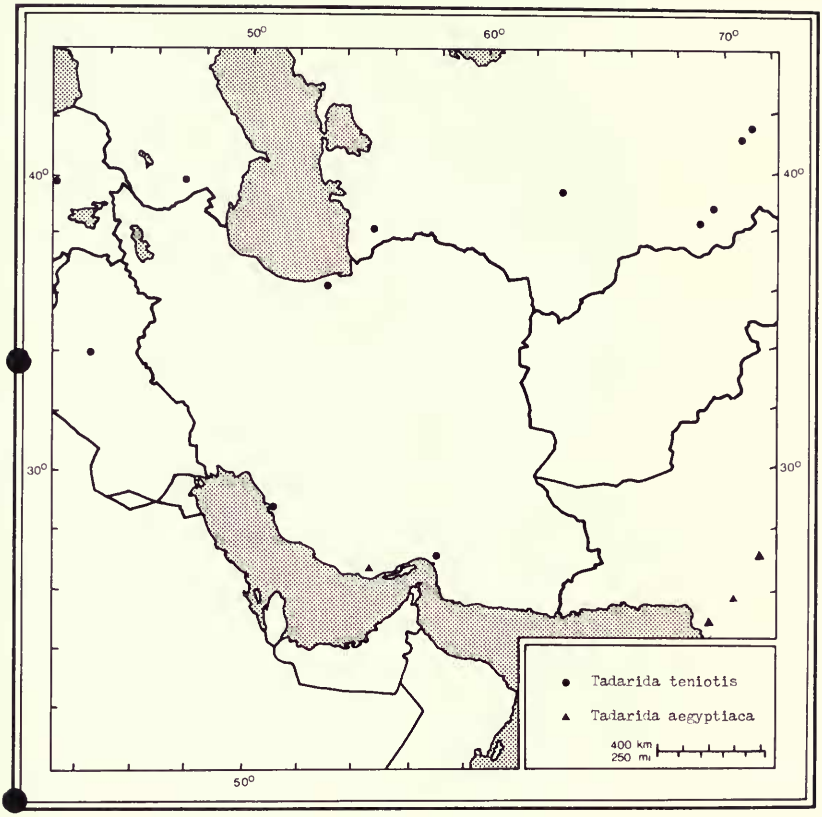

FIG. 128. Distribution of *Tadarida teniotis* and *T. aegyptiaca*.

630, 705-6), Khorasan Province. DeBlase (1971a, p. 12) reported the 1968 Street Expedition specimen from Minab, Persian Gulf and Sea of Oman Coastal Province (FMNH 111598). A specimen labeled Bushire (=Bushehr), Bushehr Province is in the Iran Public Health Research collections (IPHR uncat.).

This species is known in Iran only from these four localities (fig. 128). In view of their wide separation, and the occurrence of this bat in Asia on all sides of Iran, it is reasonable to expect it to occur in all parts of the country with the probable exception of the central deserts. Lay (1967, p. 232) reported hearing and glimpsing bats that behaved much like *T. teniotis* at Ahram and Lake Famur, both in Fars Province.

Subspecies:

Tadarida teniotis teniotis (Rafinesque) ? (see above)

Tadarida teniotis rueppelli (Temminck)

Dysopes rüpelii (sic) Temminck, 1826, Monographies de Mammalogie, I, p. 224, pl. 18.

Type Locality.—Egypt.

Range.—Egypt, Lebanon, Iraq, Anatolia, and southern Iran.

Lewis and Harrison (1962, p. 477) have shown that the specimens from the Arabian Peninsula are referable to *T. t. rueppelli*. This subspecies differs from the nominate form only in its "decidedly paler grey brown colour of the back which lacks the warm brown tint of *T. t. teniotis*" (Lewis and Harrison, 1962, p. 477). The two Iranian specimens examined by Lewis and Harrison are preserved in spirit, and thus their color could not be determined precisely, but these authors felt that these specimens will be found to belong to *T. t. rueppelli*. Unfortunately, the Minab and Chelmir specimens are also preserved in spirit and their color cannot be described accurately. I had no color standard available when examining the IPHR specimen from Bushehr, but my notes say "grey brown but more grey than brown."

Meyer-Oehme (1965) described his mummified specimen from Afghanistan as follows: "Color of skin of dorsum and venter: mat pale brown; hairtips dorsally and ventrally isabel colored; base of hair whitish." He stated that "it cannot be decided from a single specimen whether the specimen from Kabul belongs to *T. t. teniotis* or *T. t. rueppelli* as the variable color of the hair is the only difference." However, he then went on to state that "the pale brown color typical for *T. t. teniotis* is present in this specimen." Bobrinskii et al. (1965, p. 116) did not designate subspecies for the Soviet specimens.

On the basis of the above, and the tendency for arid-land mammals to be lighter in color than their humid-area relatives, it seems logical at least tentatively to assign the two southern Iranian specimens to *T. teniotis rueppelli*. The Elburz Mountains specimen, coming from a considerably moister environment, may well prove to be the nominate form, *T. t. teniotis*.

Specimens Examined:

In addition to the three Iranian specimens, I have examined one each from Lebanon (FMNH 99569), Egypt (FMNH 79757), and Italy (FMNH 96280).

Ecological Notes:

Virtually nothing is known of the ecology of *T. teniotis* in Iran. The Minab specimen is a male shot as it flew high over the Dozan River on 29 November 1968. The circumstances of collection are not recorded for any of the other Iranian specimens. The Chelmir specimens are two adult females collected on 14 July 1969 and two adult males collected on 16 July 1969. The IPHR Bushehr specimen is an immature male collected during the summer of 1968. Bushehr and Minab are both towns on the southern coastal lowland. This is a very arid area and fits with Hoogstraal's (1962, p. 161) comment that in Egypt this species "roosts in colonies in small hillside caves in desert areas near cultivation." The "Foot of the Elburz Mts." could, in itself, be interpreted as either the foot of the mountains on the south, which would be the arid strip between the Elburz and the Dasht-i-Kavir, or the northern slope, which would be the Caspian coastal lowland. The remaining location data on this specimen, "SE Caspian," would seem to indicate the north side of the mountains. If this is the case, the southern specimens came from an area of less than 100 mm. of precipitation per year (Minab) and less than 400 mm. per year (Bushehr), whereas the northern specimen comes from an area of over 600 to 1,000 mm. per year (Ganji, 1968, p. 234).

Tadarida aegyptiaca (Geoffroy)

Nyctinomus aegyptiacus Geoffroy, 1818, Description de l'Egypte, 2, p. 128, pl. 2, no. 2.

Type Locality.—Egypt.

Type Specimen.—Paris Museum (Dobson, 1878, p. 424).

General Range:

Egypt, Algeria, Nigeria, Sudan, Tanzania, Zaire, Zambia, Angola, and south to Cape Province (Hayman and Hill, 1971, p. 65). Aden (Harrison, 1964, p. 111). Afghanistan (Meyer-Oehme, 1965). Pakistan (Siddiqi, 1969, p. 9; Roberts, 1977, p. 62). India and Ceylon (Hill, 1961, p. 33).

Iranian Distribution:

Tadarida aegyptiaca has been reported only from the village of Chah Moslem, about 57 km. N Bandar-e-Lengeh, Persian Gulf and Sea of Oman Coastal Province (DeBlase, 1971a, p. 12) (fig. 128). Since this species is known from many areas west of Iran and many more east of this country, it is likely that it occurs in southern Iran east to Pakistan and perhaps west from the Bandar-e-Lengeh region as well. Its occurrence in Kabul, Afghanistan, at about 5,900 ft. elevation indicates that it could be found through much of the mountainous southern area of Iran.

Subspecies:

Specimens of *Tadarida aegyptiaca* from Egypt and Aden have been referred to the nominate form. Three forms have been described from India: *T. a. sindica, T. a. thomasi,* and *T. a. gossei*, all Wroughton, 1919. Wroughton (1919, pp. 731-732) keyed these four forms as follows:

A. Size larger, forearm about 52 mm.
    a. General colour paler, about "drab grey." ......*aegyptiaca*, Geoff.
    b. General colour darker, about "mouse grey." ....*sindica*, sp.n.
B. Size larger [sic], forearm 48 mm. or less.
    a. General colour paler, near "seal brown." ....*thomasi,* sp.n.
    b. General colour darker, near "clove brown." ....*gossei,* sp.n.

Various authors have accepted all three of the Indian forms (Ellerman and Morrison-Scott, 1951; Hill, 1961, pp. 33-34), lumped the two smaller ones (Sinha, 1970, pp. 87-88), or considered all three inseparable (Brosset, 1962, p. 708). Since forearms of the two Iranian specimens are over 52 mm., and since *sindica* has page priority over *thomasi* and *gossei*, the exact status of the three Indian forms is irrelevant to this study.

Wroughton (1919, pp. 731-732) distinguished *aegyptiaca* from *sindica* on the basis of color. Hill (1961, p. 33) also said that "*T. aegyptiaca sindica* differs from *T. a. aegyptiaca* in its darker coloration." The Iranian specimens are both too brown for "Mouse Gray" (Ridgway, 1912, Pl. LI) and too light for "Drab Gray" (Ridgway, 1912, Pl. XLVI). Both fit the color description of the Aden specimens given by Harrison (1964, p. 109) particularly with reference to the "distinct pale speckling on the posterior back where the extreme hair tips are obscurely tipped with creamy white." However, they also fit the description of *T. a. sindica* given by Hill (1961, p. 33). Harrison (1964, pp. 109, 111) did state that the Aden specimens are "unusually pale brown or grey for this species ... in this respect quite unlike the African material seen." Unfortunately, he did not mention which African material he was referring to, but I assume he meant other *T. a. aegyptiaca* and not a different African subspecies.

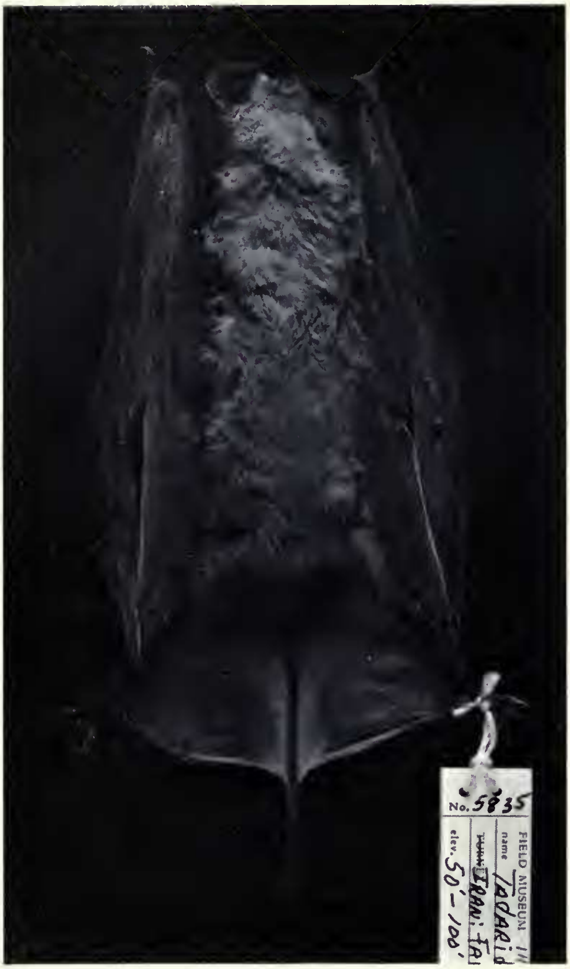

Fig. 129. Skin of *Tadarida aegyptiaca* collected at Chah Moslem (ventral view).

Meyer-Oehme (1965) described his specimens from Kabul, Afghanistan, as follows:

> "The coloration of the back is mat brown (not gray!) venter paler in the middle, some white hairs at the ventral base of the wing membrane. The light Y-pattern mentioned in the literature for *T. ae. sindica* is not recognizable. The posterior edge of the wing membrane is whitish. According to the measurements [FA 49.5 to 53.5 mm for nine females] the specimens from Afghanistan belong without doubt to the race *T. ae. sindica*."

The posterior whitish edge of the wing membrane, a character not mentioned by Wroughton (1919), Hill (1961), or Harrison (1964), is conspicuous in both of the Iranian specimens (fig. 129). Harrison (pers. comm., July, 1971) has informed me that the Aden specimens also have a distinct white wing edge.

To summarize, the dorsal coloration of the large *Tadarida aegyptiaca* from Asia has been described as "mouse grey" (India: Wroughton, 1919, p. 732), "grey brown" (India: Hill, 1961, p. 33), "pale brown or grey" (Aden: Harrison, 1964, p. 109), and "mat brown (not gray!)" (Afghanistan: Meyer-Oehme, 1965). The Iranian specimens are both gray, but are browner than "Mouse Gray" of Ridgway. I do not know what Meyer-Oehme's "mat brown" is like but from his emphatic "not gray!" I must assume that the Iranian specimens are grayer than the ones from Afghanistan. The larger of the two Iranian specimens is slightly lighter than the smaller and has slightly less of the "speckling" described by Harrison (1964, p. 109). If *T. a. sindica* and *T. a. aegyptiaca* are indeed distinct, on the basis of the above similarities all of the larger Asian representatives of this species are probably referable to *T. a. sindica*.

Hill (1961, p. 33) also differentiated *T. a. sindica* from *T. a. aegyptiaca* by the greater degree of reduction of P^2 in *sindica*. For the species as a whole he said, "the anterior upper premolar is minute and is not usually in contact with the canine cingulum." For the subspecies, *sindica*, he said, "the anterior upper premolar is small, extruded slightly from the line of the toothrow and in contact with the canine cingulum." In one Iranian specimen (FMNH 111596) P^1 is slightly out of the tooth row and in contact with the canine cingulum. In the other (FMNH 111597) P^1 is also slightly out of the tooth row but not quite in contact with the canine cingulum. In this character the Iranian specimens also seem to agree with *T. a. sindica*. However I have not had skulls of either subspecies available for direct comparison and thus do not know how consistent this difference in dentition is. Harrison (1964, p. 111), in describing the dentition of the Aden specimens, said that P^1 is small and situated within the tooth row. He did not mention its contact, or lack of contact, with the canine.

Neither external nor cranial measurements seem to be of assistance in distinguishing *T. a. aegyptiaca* from *T. a. sindica* as the two are presently recognized. Too few specimens, from too few locations, are known to determine the relationship between these two forms at this time.

Specimens Examined:

In addition to the Iranian specimens (FMNH 111596-7) mentioned above, I have examined two from Aden (BM 54.1018-9) and two from India (BM 15.11.1.51, holotype of *T. sindica* Wroughton, and BM 12.10.4.32, holotype of *T. thomasi* Wroughton).

Ecological Notes:

The two Iranian specimens of *T. aegyptiaca* were shot as they flew over camp at the edge of Chah Moslem on 22 November 1968. In Aden Harrison (1964, p. 111) found this species in "crevices in the low cliffs along the Wadi Saghir"; in Afghanistan Meyer-Oehme (1965) observed them flying out of an adobe house in Kabul; and in India Brosset (1962, p. 709) said that they inhabit "Deep crevices in the stones of cliffs or large buildings where they are inaccessible to man." All of these habitat types are readily accessible near the village of Chah Moslem.

Both Iranian specimens appear to be adult males. The teeth of FMNH 111596 are less worn than those of FMNH 111597 and the former may prove to be a young of the year. Neither specimen exhibited signs of reproductive activity.

11. DELETIONS FROM THE IRAN FAUNAL LIST

The following species are questionably or incorrectly reported from Iran:

Myotis myotis (Borkhausen), 1797

Numerous authors (e.g., Cheesman, 1921; Misonne, 1959) have referred to *Myotis myotis* from Iran. However, Harrison and Lewis (1961) have shown that the forms *omari* and *risorius* are referable to the species *M. blythi*, a species distinct from *M. myotis*. I have examined most specimens of large *Myotis* from Iran and have found them all to be referable to *M. blythi*.

Eptesicus walli Thomas, 1919

Etemad (1973) reported *E. walli* from Iran. I consider this name to be synonymous with *E. nasutus*. See the preceding section on *E. nasutus* for a discussion of this.

Pipistrellus nathusii (Keyserling and Blasius), 1839

This species was included in the list of bats from Iran by Lay (1967, p. 232) and by Etemad (1969, p. E16). However, there appear to be no specimen records documenting the presence of *P. nathusii* in Iran. Both of these authors cited Ellerman and Morrison-Scott (1951, p. 184) who listed "?Persia" in the range for this species, and Etemad also cited Ognev (1928, p. 489) who said merely that "it has also been obtained in ... southern Persia, Baluchistan." This evidence does not seem sufficient to include *P. nathusii* on the faunal list of Iran (see Chapter 12).

Pipistrellus mimus Wroughton, 1899

Pipistrellus mimus was reported from Shiraz, Fars Province, by Cheesman (1921, p. 576). Lay (1967, p. 233) and Etemad (1969, p. E17) both included this species in their lists. However, Neuhauser

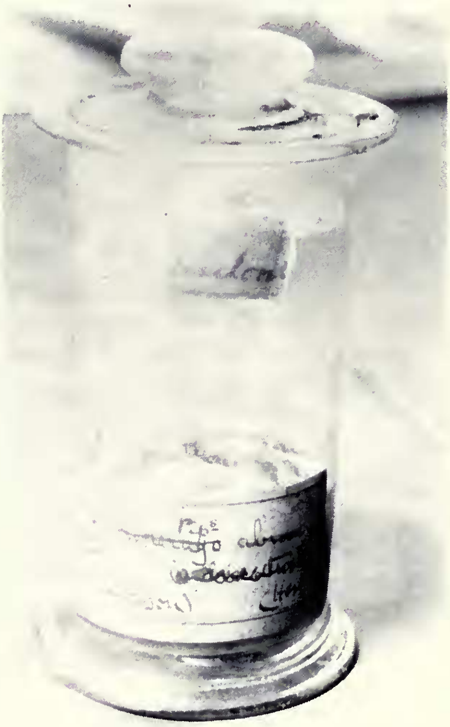

FIG. 130. British Museum (Natural History) specimen jar which contained possible *Pipistrellus coromandra* reported from Iran.

and DeBlase (1971) have shown that these Shiraz specimens are *Pipistrellus p. aladdin* rather than *P. mimus*.

Pipistrellus coromandra (Gray), 1838

Pipistrellus coromandra was reported from Shiraz, Fars Province, by Dobson (1871, p. 461) who listed "Several spirit specimens of immature individuals referable to this species." Lay (1967, p. 233) and Etemad (1969, p. E17) both included this species in their faunal lists, but Lay expressed the possibility that these could be a species of *Pipistrellus* other than *coromandra*.

I have searched the spirit collections of the British Museum in an attempt to locate these specimens but failed to find any immature spirit specimens labeled from Shiraz. I did locate an ancient jar (fig.

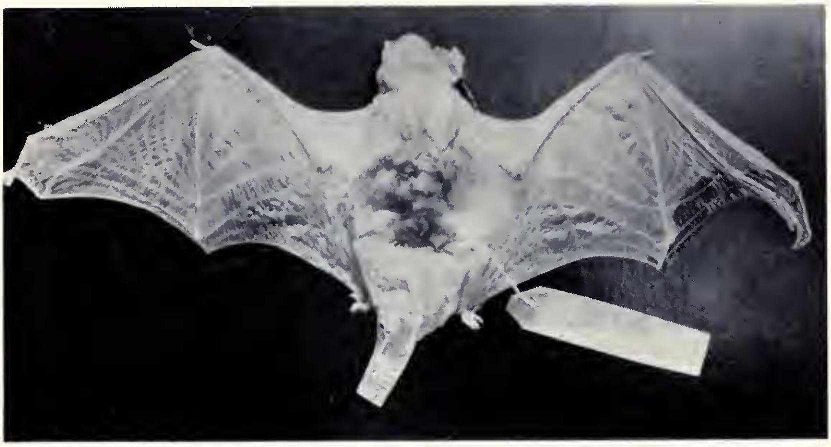

FIG. 131. One of three *Pipistrellus* sp. found in jar shown in Figure 130.

130) containing three small *Pipistrellus* in a poorly preserved condition with fur slipping badly, so that the specimens were almost denuded (fig. 131). The specimens are not cataloged and a label on the exterior of the jar states, "2 ♂ + ♀ imm.," "*Pips. coromandra*," "G. E. Dobson," "T G. Jerdon." No locality or other data are given. These could, conceivably, be the specimens to which Dobson referred. However, while the jar label says "imm.," the specimens are adults. The epiphyses are fully ossified and the teeth are fully erupted and slightly worn. Because of the poor condition of the specimens I was unable to identify them to species but was able to establish that they are not one of the three species of *Pipistrellus* presently known from Iran: *P. pipistrellus, P. kuhli,* or *P. savii*. Exclusion of these was made by size, dental characters, coloration, and penis shape. If these are the specimens to which Dobson (1871, p. 461) referred, and if they are from Shiraz, they represent a species new to the country. However, I do not believe there is enough evidence to warrant inclusion of *P. coromandra* on the faunal list of Iran at this time.

12. PROBABLE ADDITIONS TO THE IRAN FAUNAL LIST

The following species may occur in Iran but, as yet, have not been taken from that country:

Rhinolophus lepidus Blyth

Rhinolophus lepidus Blyth, 1844, Jour. Asiat. Soc. Bengal, **13**, p. 486.

Type Locality.—?Calcutta, India.

Rhinolophus lepidus is a small *Rhinolophus*, only slightly larger than *R. hipposideros* and smaller than the medium-sized *R. euryale, R. mehelyi*, and *R. blasii*. It may be easily distinguished from *R. hipposideros* by its short but sharply-pointed dorsal connecting process of the sella.

Neuhauser and DeBlase (in prep.) reported *R. lepidus* from several localities in Afghanistan, including two localities in the western portion of that country (fig. 132). This species may occur in similar habitats in eastern Iran, particularly Khorasan Province.

Hipposideros fulvus Gray

Hipposideros fulvus Gray, 1838, Mag. Zool. Bot., **2**, p. 492.

Type Locality.—Dhawar, India.

Hipposideros fulvus may be easily distinguished from the other hipposiderine bats in the area by its relatively simple nasal ornamentation. The dorsalmost flap of the noseleaf is a continuous, flat-topped structure rather than the tripartite structure of *Triaenops* and *Asellia*.

Wroughton (1920, p. 315) reported a single male *H. fulvus* from Panjgnr, Pakistan, not far from the Iranian border in Baluchistan (fig. 132) and Roberts (1977, p. 58) reported it from Hoshab in Baluchistan, as well as from areas further east in Pakistan. Since *H. fulvus* occurs in Pakistani Baluchistan, it may be expected to occur in Iranian Baluchistan as well.

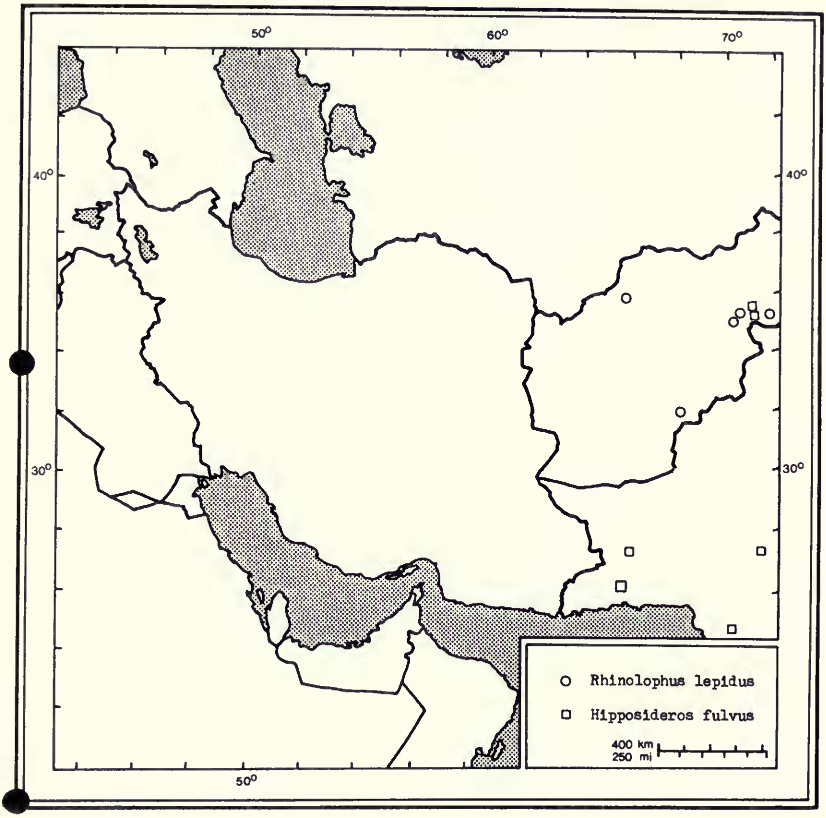

FIG. 132. Distribution of *Rhinolophus lepidus* (circles) and *Hipposideros fulvus* (squares) in Afghanistan and Pakistan adjacent to Iran's eastern border.

Pipistrellus nathusii (Keyserling and Blasius)

Vespertilio nathusii Keyserling and Blasius, 1839, Arch. Naturgesch., **5**, 1, p. 320.

Type Locality.—Berlin, Germany.

Pipistrellus nathusii is very similar to *P. p. pipistrellus* in general appearance but is slightly larger. The thumb of *P. nathusii* is longer than in *P. kuhli, P. pipistrellus*, or *P. savii*. The length of the thumb in *P. nathusii* is greater than the width of the wrist, whereas the thumb in the other species named is shorter than the width of the wrist.

Although several authors have included *P. nathusii* on the faunal list for Iran (see Chapter 11), there are no specimens or exact lo-

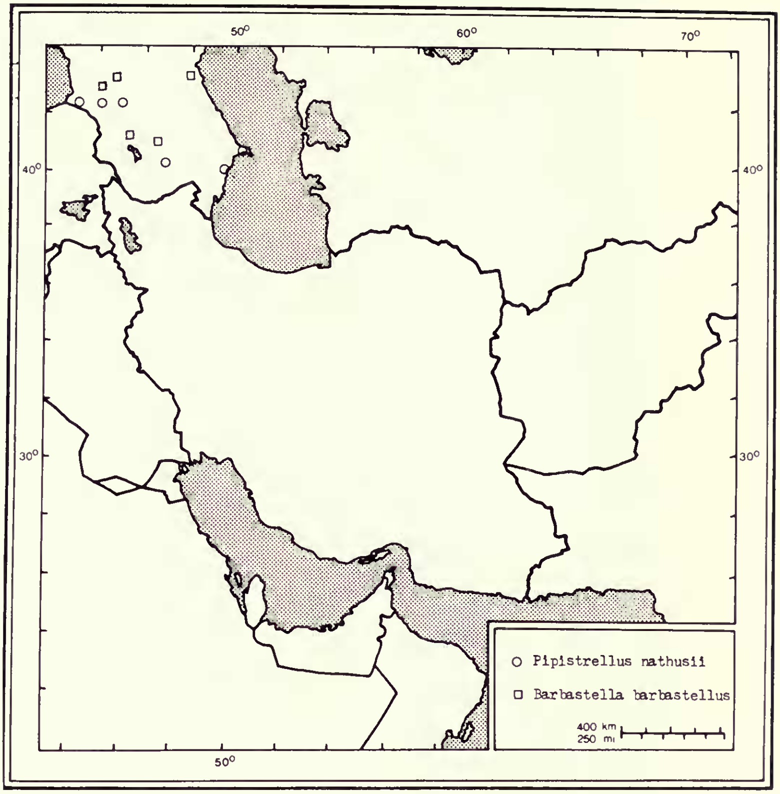

FIG. 133. Distribution of *Pipistrellus nathusii* (circles) and *Barbastella barbastellus* (squares) in the USSR near Iran's northwestern border.

cality records to document this. This species does occur, however, in the Transcaucasian area of the USSR where Bobrinskii et al. (1965, Map 31) showed several localities (fig. 133). It may be expected to occur in Iranian Azarbaijan and in the Elburz.

Pipistrellus rueppelli (Fischer)

Vespertilio rüppellii Fischer, 1929, Synopsis Mammalium, 109.

Type Locality.—Dongola, Sudan.

Pipistrellus rueppelli is paler in pelage color than *P. kuhli* or *P. p. aladdin*. The wing and tail membranes are tan, contrasting sharply with the black limbs, tail, and ears. I^2 is very short, barely exceeding

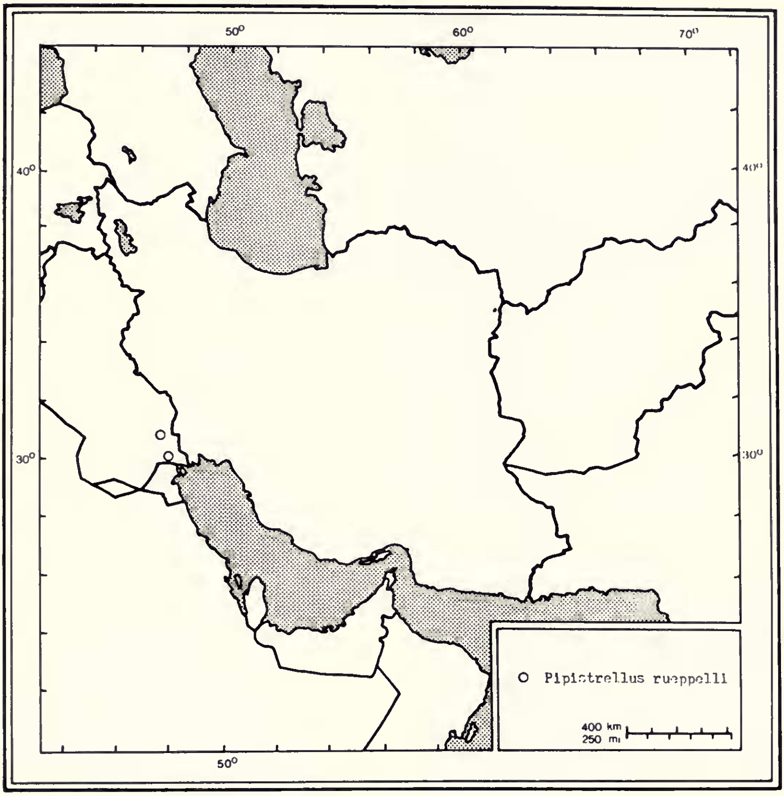

FIG. 134. Distribution of *Pipistrellus rueppelli* in Iraq adjacent to Iran's southwestern border.

the cingulum of I^1, whereas P^1 is larger than in other species of *Pipistrellus* from the area.

Pipistrellus rueppelli is known from two localities in southern Iraq (Harrison, 1964, p. 159) very near the Iranian border (fig. 134). It probably does occur on the Khuzistan Plain in southwest Iran.

Barbastella barbastellus (Schreber)

Vespertilio barbastellus Schreber, 1774, Die Saugethiere, 1, p. 168 (pl. 55).

Type Locality.—Burgundy, France.

The ear of *B. barbastellus* has a conspicuous "nipple" extending out from the labial margin of the pinna, whereas that of *B.*

leucomelas has no such protuberance. The coloration of *B. barbastellus* is considerably darker than that of *B. l. leucomelas* but is similar to that of *B. l. darjelingensis* (Neuhauser and DeBlase, 1974, pp. 91-93).

Bobrinskii et al. (1965, Map 27) mapped localities for *B. barbastellus* and *B. leucomelas* in the Transcaucasus area of the USSR (fig. 133). This is the only known area of sympatry for these two forms. If *B. barbastellus* is in fact a species distinct from *B. leucomelas*, it may occur in Iranian Azarbaijan and the Elburz.

13. ZOOGEOGRAPHY

Although 38 species of bats are presently known from Iran, the record remains sketchy and incomplete. Only two species, *Myotis blythi* and *Pipistrellus kuhli*, are known from more than 30 locations, and only 11 more are known from more than 10 locations. Twenty-one of the species are known from five or fewer localities, and six of these have been reported from a single site. In spite of this incomplete distribution documentation, it is possible to draw some conclusions on faunal composition.

Misonne (1968, p. 296) pointed out that an important characteristic of the mammalian fauna of Iran is the high proportion of endemic species. He placed this at 18 per cent. However, exactly the opposite is true if only the Chiroptera are considered. Of the 38 species of bats now documented from Iran, none is restricted to the political boundaries of the Iranian nation, and none is restricted to the main physiographic feature of the area, the Iranian Plateau.

Faunal Affiliations

The Iranian bat fauna is strongly Palearctic in its affinity. Twenty-seven species are entirely, or almost entirely, restricted to the Palearctic faunal region. Of the remaining 11 species one, *Miniopterus schreibersi*, ranges widely through all four faunal regions in the Eastern Hemisphere. One species, *Barbastella leucomelas*, ranges widely in both the Palearctic and Oriental faunal regions, and two other species, *Rhinolophus blasii* and *Pipistrellus kuhli*, range widely in both the Palearctic and the Ethiopian faunal regions. *Triaenops persicus* has a rather restricted range but seems to be more widely distributed in the Ethiopian region than in the Palearctic.

The remaining six species, *Rousettus aegyptiacus, Rhinopoma microphyllum, Rhinopoma hardwickei, Taphozous perforatus, Taphozous nudiventris,* and *Tadarida aegyptiaca*, range widely through the Ethiopian region and through India but are found in the Palearctic only in a restricted portion of southwestern Asia. Three of these, *R. microphyllum, R. hardwickei*, and *T. nudiventris*, continue through India well into the Oriental region.

Many mammals in other orders have come to Iran from the Oriental region, e.g., *Funambulus, Selenarctos,* and *Gazella* (Misonne, 1968, p. 298), but none of the 38 species of bats presently known from Iran is primarily Oriental in distribution. However, as stated above, the fauna of Iran is still poorly known and that of the southeastern portion is known least well. It is quite possible that Oriental species such as *Hipposideros fulvus*, known from western Pakistan (Siddiqi, 1969), and *Rhinolophus lepidus*, known from western Afghanistan (Neuhauser and DeBlase, in prep.), will be found in Iran (fig. 132).

Numerous species of bats, e.g., *Rhinolophus hipposideros* and *Nyctalus leisleri*, have entered Iran from the northwest. *Barbastella barbastellus* and *Pipistrellus nathusii* occur in the Caucasus (Bobrinskii et al., 1965) and will likely eventually be found in adjacent portions of Iran (fig. 133).

Other species of bats, e.g., *Rhinolophus bocharicus* and *Eptesicus bobrinskoi*, have entered from the Central Asian portion of the USSR and still others, e.g., *Myotis mystacinus* and *Vespertilio murinus*, have probably entered from both sides of the Caspian.

Some bat species, e.g., *T. nudiventris* and *P. kuhli*, have very likely entered Iran from the Khuzistan Plain of Iraq. *Pipistrellus rueppelli* (fig. 134) will probably also enter Iran from this direction or may have already done so. A few species have close affinities to the bat fauna of Oman. These are mainly forms that range widely from India to Africa, e.g., *T. perforatus* and *T. aegyptiaca*, and it is impossible to say in which direction they have crossed the Strait of Hormoz.

Several bat species achieve a directional maximum of their worldwide distribution in Iran. Iranian records of *Rhinolophus euryale, R. mehelyi, Triaenops persicus,* and *Myotis bechsteini* are the eastern limits of the known distributions of these species. Southern Iran is also the northern distribution limit for *T. persicus*. Kutur Su is both the westernmost and southernmost record of *E. bobrinskii* (Bobrinskii et al., 1965). The Iranian records of *Myotis emarginatus, M. nattereri, M. bechsteini, M. capaccinii, V. murinus,* *N. leisleri, N. lasiopterus, Pipistrellus pipistrellus, P. savii,* and *Tadarida teniotis* are, or nearly are, the southernmost records for these species. Some, e.g., *P. savii* and *T. teniotis*, may be known from somewhat further south in India.

Internal Groupings

All but two Iranian bat species fall into one of three geographic groups in Iran. Nineteen species are primarily "northern" in their distribution. Nine species are primarily "southern," and eight are widely ranging in both north and south.

The "northern" species are found on the Caspian coast, in the Zagros Mountains south to about the area of Shiraz (29°36'N, 52°32'E), in the Elburz Mountains, in northeastern Iran, and on the margins of the Iranian basin flanking these areas (fig. 135). The following 19 species occur primarily in this "northern" area of comparatively higher precipitation and cooler summers (see Chapter 2):

Rhinolophus bocharicus
Rhinolophus euryale
Rhinolophus mehelyi
Myotis mystacinus
Myotis nattereri
Myotis bechsteini
Myotis blythi
Vespertilio murinus
Eptesicus bobrinskoi
Eptesicus nilssoni
Eptesicus bottae
Eptesicus serotinus
Nyctalus leisleri
Nyctalus noctula
Nyctalus lasiopterus
Pipistrellus pipistrellus
Pipistrellus savii
Barbastella leucomelas
Miniopterus schreibersi

Four of these, *M. bechsteini, E. nilssoni, N. noctula,* and *N. lasiopterus,* are known only from the Caspian coast and the adjacent lushly vegetated north slope of the Elburz Mountains. One, *R. bocharicus*, is known only from the northeastern corner of the country and two, *R. mehelyi* and *M. nattereri*, have been reported only from the Zagros Mountains. *Eptesicus bobrinskoi* has been reported in Iran only from the mountains of northern East Azarbaijan Province, but its range in the USSR indicates that it should occur in northern Khorasan Province. Seven of these 19 "northern" species, *M. mystacinus, M. blythi, E. serotinus, N. leisleri, P. pipistrellus, B. leucomelas*, and *M. schreibersi*, have been reported from scattered locations throughout this "northern" area, and four more, *R. euryale, V. murinus, E. bottae,* and *P. savii* are known from all of the "northern" area except the Caspian coastal region.

The "southern" species range primarily through the Khuzistan Plain; the southern coastal strip; the lower, more arid mountains

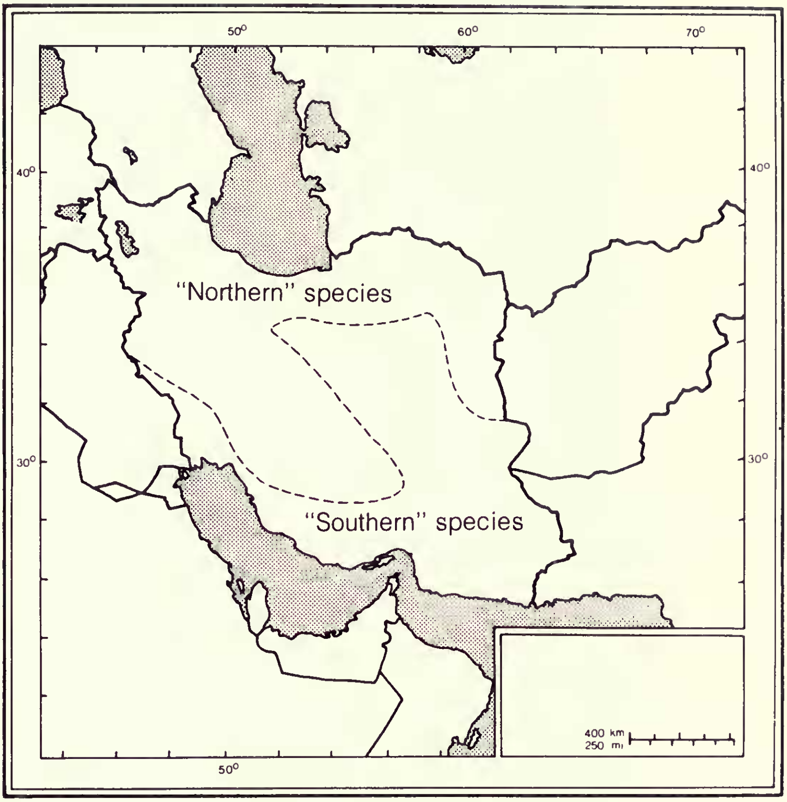

FIG. 135. The "northern" and "southern" regions into which Iran can be split on the basis of bat fauna. The central deserts are only provisionally assigned to the "southern" region since bat specimens are virtually unknown from these deserts.

south of the vicinity of Shiraz; Baluchistan; and Seistan. No bats are known from the central deserts, but this is probably the result of a lack of collecting rather than an absence of bats. On the basis of habitat it seems reasonable to assume that bats from this region would be more similar to the "southern" group than to the "northern" (fig. 135). The following nine species occur in this relatively hotter, more arid southern portion of the country:

Rousettus aegyptiacus
Rhinopoma microphyllum
Rhinopoma hardwickei
Rhinopoma muscatellum
Taphozous perforatus
Asellia tridens
Triaenops persicus
Eptesicus nasutus
Tadarida aegyptiaca

Of these nine "southern" species four, *R. microphyllum, R. muscatellum, A. tridens,* and *E. nasutus*, occur through most of the "southern" region; one, *R. hardwickei*, occurs in the Khuzistan Plain and through the southern Zagros but is not known to range into Baluchistan; two, *R. aegyptiacus* and *T. persicus*, range through the southern Zagros and Baluchinstan but are not known from the Khuzistan Plain; and two, *T. perforatus* and *T. aegyptiaca*, are known from only two localities on the coast near the intergrade between the southern Zagros Mountains and the Mekran Range of Baluchistan.

In the southern Zagros Mountains there is no sharp line of demarcation between the "northern" and "southern" species groups, and there is much overlap. One species, *Myotis capaccinii*, is found in Iran only in this area of overlap.

Eight species are found at widely scattered points in both the "northern" and "southern" regions.

Taphozous nudiventris
Rhinolophus ferrumequinum
Rhinolophus hipposideros
Rhinolophus blasii
Myotis emarginatus
Pipistrellus kuhli
Plecotus austriacus
Tadarida teniotis

Of these eight species five, *R. ferrumequinum, R. hipposideros, R. blasii, M. emarginatus,* and *P. austriacus*, are basically "northern" species with only a few records in the "southern" region and one, *T. nudiventris*, is basically a "southern" species with only a few records in the "northern" region. *Tadarida teniotis* is known from only four localities in Iran, two in the extreme north, and two in the extreme south. *Pipistrellus kuhli* is not only the most commonly collected Iranian bat, it is also the most widely ranging and has been collected rather frequently in all areas except northern Khorasan and the Caspian coastal region.

One Iranian species, *Otonycteris hemprichi*, would appear, from existing records, to fall into the "northern" group. However, the distribution of this species in Arabia and Pakistan indicates that it is more correctly characterized as wide-ranging.

Index of Faunistic Congruence

In his analysis of the Japanese bat fauna, Wallin (1969, p. 374) calculated an index of faunistic congruence to "give an integrated picture of the bat-fauna in Japan and its relation to those of other areas in the Palearctic region and the adjacent Oriental region on the continent." This index is calculated by the formula:

$$I_{a,b} = \sqrt{P_{a\rightarrow b} \cdot P_{b\rightarrow a}}$$

$I_{a,b}$ is the index of faunistic congruence between region a and region b. $P_{a\rightarrow b}$ is the percentage of species of region a also occurring in region b, and $P_{b\rightarrow a}$ is the percentage of species in region b also occurring in region a. The higher the resulting index number, the greater is the similarity between the two faunas. The index for two areas with identical species composition would be 100. For a discussion of the validity of this technique, see Wallin (1969, pp. 374-91).

Wallin used the index to compare bat faunas of large areas with relatively diverse habitats, e.g., Europe (excluding Scandinavia), southwest Asia, and China, and based his species lists for each area primarily on Ellerman and Morrison-Scott (1951). I have used his formula to compare the bat faunal composition of Iran as a whole and of the "northern" and "southern" regions separately with numerous adjacent geographical areas. The areas used for comparison were selected because of relatively homogenous habitat and/or because of the availability of relatively recent faunal lists. The areas are listed below:

1. The Levant. The eastern Mediterranean, including Lebanon, Israel, western Syria and Jordan, Hatay Province of Turkey, and the Sinai Peninsula. Faunal list based primarily upon Harrison (1964, 1972).
2. Saudi Arabia. Faunal list based upon Nader (1975).
3. Oman. The southeastern portion of the Arabian Peninsula, including Oman, the United Arab Emirates, and adjacent portions of Saudi Arabia. Faunal list based primarily upon Harrison (1964, 1972).
4. Yemen. The southwest corner of the Arabian Peninsula including the two Yemen nations and adjacent portions of Saudi Arabia. Faunal list based primarily upon Harrison (1964, 1972).
5. Mesopotamia. The Tigris-Euphrates valley and adjacent areas including Kuwait and all of Iraq except the Zagros Mountains in Kurdistan. Faunal list based primarily on Harrison (1964, 1972).
6. Egypt (excluding Sinai). Faunal list based upon Gaisler et al. (1972).
7. Sudan. Faunal list based upon Koopman (1975).

8. Northwest Africa. Morocco, Mauritania, Algeria, and Tunisia. Faunal list based upon Hayman and Hill (1971).
9. Mediterranean Europe. Portugal, Spain, southern France, Italy, the Balkan Peninsula, Greece, and Thrace. Faunal list based primarily upon van den Brink (1968).
10. Soviet Europe. The USSR east to the Urals and south to the Black Sea and the Caucasus Mountains. Faunal list based primarily upon Bobrinskii et al. (1965).
11. Northern Europe. The portion of Europe not included in numbers 9 and 10 above. Faunal list based primarily upon van den Brink (1968).
12. Anatolia. Turkey excluding Thrace and Hatay Province. Faunal list based primarily upon Kumerloeve (1975a).
13. Caucasia. Armenia, Georgia, and Azarbaijan in the USSR. Faunal list based primarily upon Bobrinskii et al. (1965).
14. Trans-Caspia. Turkmeniya, Uzbekistan, Tadzhikistan, and southern Kazakhstan in the USSR. Faunal list based primarily upon Bobrinskii et al. (1965).
15. Siberia. The USSR east of the Urals and north of central Kazakhstan but excluding the Vladivostok area. Faunal list based primarily upon Bobrinskii et al. (1965).
16. Japan. Faunal list based upon Wallin (1969).
17. Afghanistan. Faunal list based upon Gaisler (1970, 1971), Neuhauser and DeBlase (1974), and unreported specimens.
18. Pakistan. Faunal list based primarily upon Siddiqi (1969) and USNM specimens.
19. North and Central India. As defined by Brosset (1962). Faunal list based primarily upon Brosset (1962).

The results of these calculations are shown in Table 22 and Figures 136 to 138. As a whole, the bat fauna of Iran is quite similar to that of Caucasia (77.9), the Levant (75.3), Anatolia (72.8), Trans-Caspia (72.6), and Afghanistan (69.3). These last four border upon Iran and their similarity is to be expected, but the high index of congruence for the Levant is unexpected since this area is separated from Iran by Mesopotamia (49.9).

The bat fauna of northern Iran is most similar to Caucasia (89.1), Trans-Caspia (83.1), Anatolia (79.6), Mediterranean Europe (74.3), and the Levant (72.4). The index of congruence for northern Iran is higher with 11 of the 19 comparative regions than it is with southern Iran (39.4). The bat fauna of southern Iran is most similar to

TABLE 22. Index of Faunistic Congruence*

Compared with	All of Iran (38)	Northern Iran (29)	Southern Iran (18)
1. The Levant (29)	75.3 (25)	72.4 (21)	56.9 (13)
2. Saudi Arabia (16)	44.6 (11)	18.6 (4)	58.9 (10)
3. Oman (8)	45.9 (8)	13.1 (4)	66.7 (8)
4. Yemen (22)	38.0 (11)	15.8 (4)	50.2 (10)
5. Mesopotamia (11)	49.9 (10)	39.2 (7)	56.8 (8)
6. Egypt (19)	48.7 (13)	29.8 (7)	59.5 (11)
7. Sudan (64)	24.3 (12)	13.9 (6)	29.5 (10)
8. Northwest Africa (29)	66.3 (22)	65.6 (19)	48.1 (11)
9. Mediterranean Europe (25)	64.0 (20)	74.3 (20)	33.0 (7)
10. Soviet Europe (24)	59.6 (18)	68.2 (18)	24.0 (5)
11. Northern Europe (20)	43.5 (12)	49.8 (12)	15.8 (3)
12. Anatolia (24)	72.8 (22)	79.6 (21)	38.5 (8)
13. Caucasia (25)	77.9 (24)	89.1 (24)	33.0 (7)
14. Trans-Caspia (22)	72.6 (21)	83.1 (21)	35.2 (7)
15. Siberia (14)	34.7 (8)	39.7 (8)	6.3 (1)
16. Japan (25)	38.9 (12)	44.6 (12)	18.8 (4)
17. Afghanistan (37)	69.3 (26)	61.1 (20)	54.2 (14)
18. Pakistan (31)	46.6 (16)	30.0 (9)	46.6 (11)
19. North and Central India (37)	21.3 (8)	12.2 (4)	23.2 (6)
Northern Iran	——	——	39.4 (9)
Southern Iran	——	39.4 (9)	——

*The number in parentheses beside the name of the region is the number of species occurring in that region. The number in parentheses beside the index number is the number of species common to the two regions.

Oman (66.7), Egypt (59.5), Saudi Arabia (58.9), the Levant (56.9), Mesopotamia (56.8), and Afghanistan (54.2). This bat fauna has a higher index of congruence with nine of the comparative regions than it does with northern Iran (39.4).

These figures further emphasize that the Iranian bat fauna is primarily Palearctic in its affinities and that it consists of two relatively distinct species complexes.

Distribution of Subspecies

Of the 10 species that are known to be represented in Iran by more than one subspecies, only one, *T. teniotis*, has the subspecies divided between the "northern" and "southern" regions as defined above. In three cases *R. hipposideros, E. serotinus,* and *P. pipistrellus*, one subspecies is restricted to the relatively lush Caspian coastal regions, whereas the other form(s) occurs in the other, drier portions of the country.

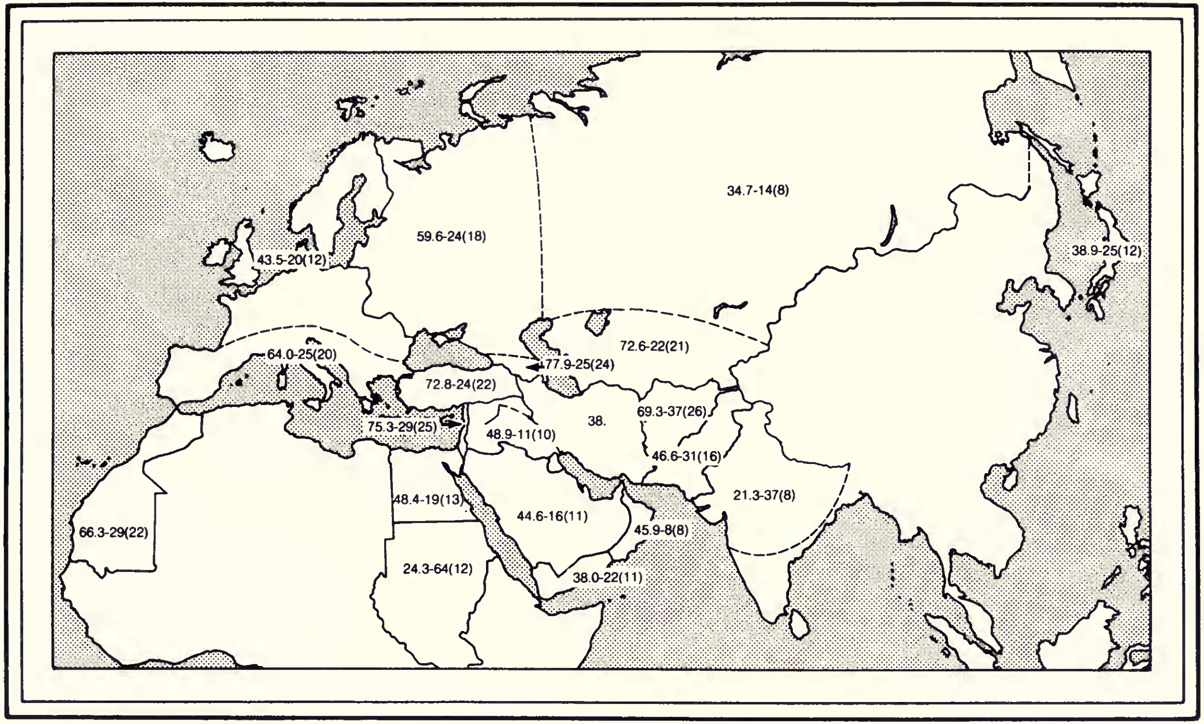

FIG. 136. The Index of Faunistic Congruence between Iran and each of 19 other areas. For each of the 19 areas the IFC value is followed by the number of bat species known from the area and, in parentheses, the number shared with Iran. Thirty-eight species are known from Iran.

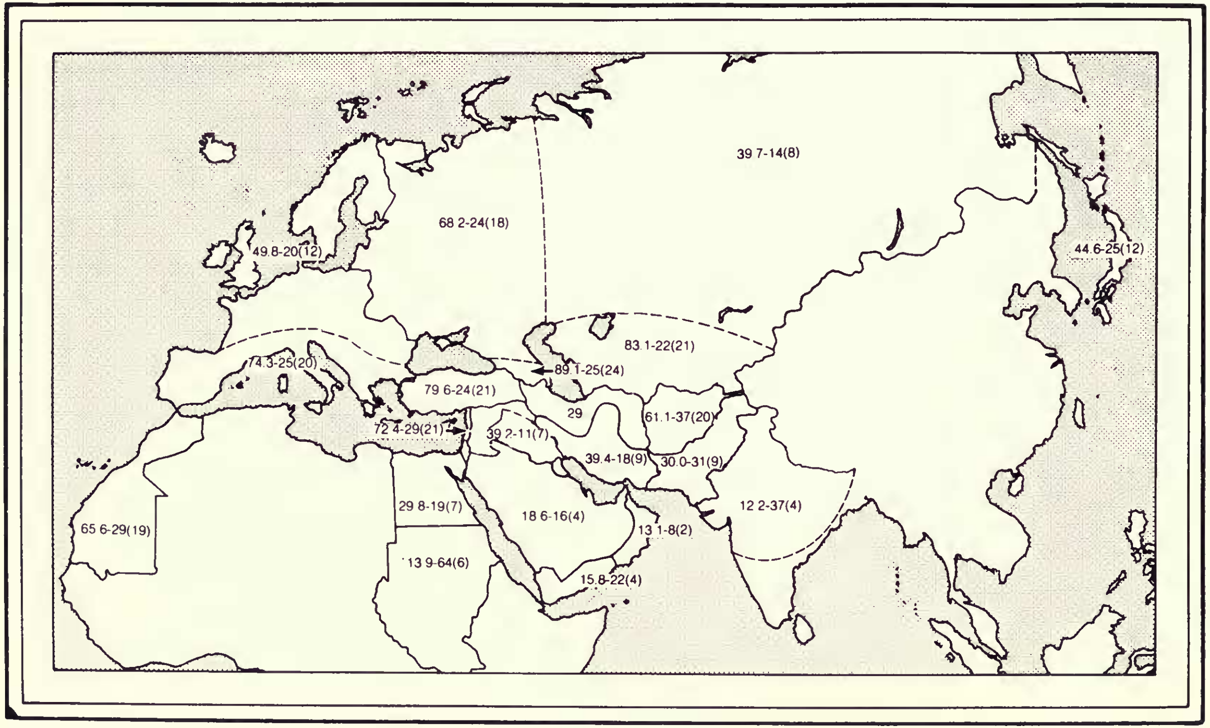

FIG. 137. The Index of Faunistic Congruence between the "northern" Iranian bat region and 20 other areas. For each area the IFC value is followed by the number of bat species known from the area and, in parentheses, the number shared with "northern" Iran. There are 29 species known from "northern" Iran.

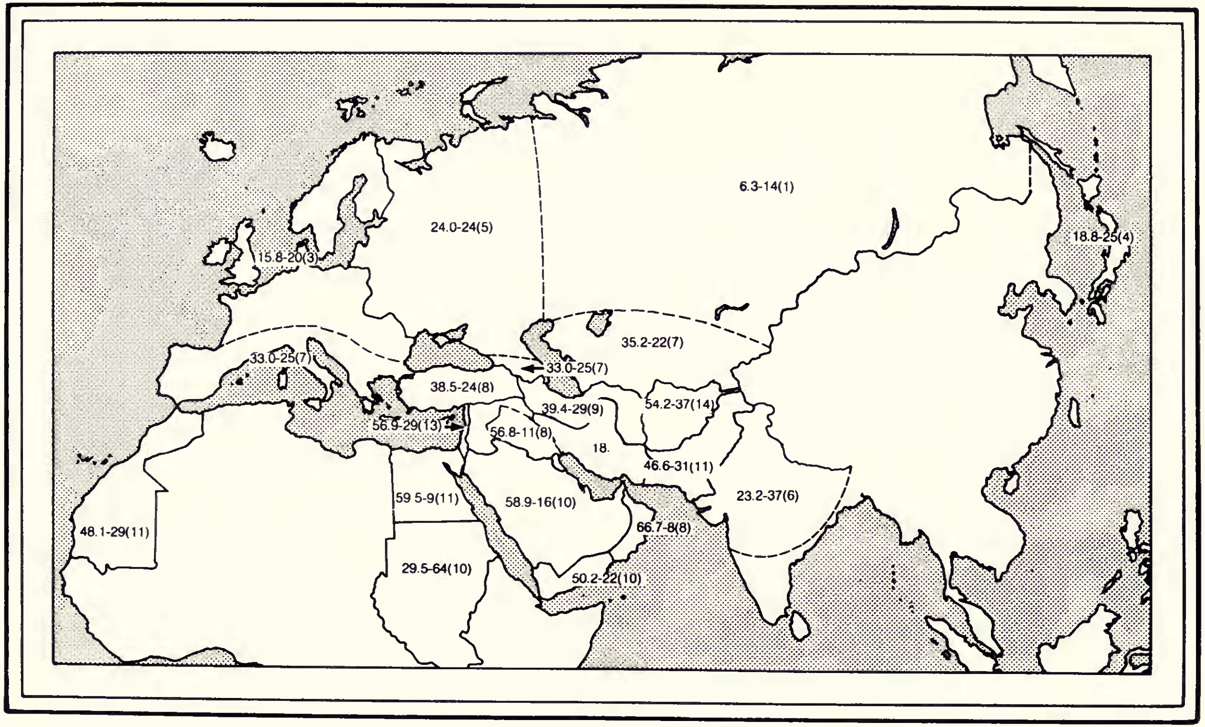

FIG. 138. The Index of Faunistic Congruence between the "southern" Iranian bat region and 20 other areas. For each area the IFC value is followed by the number of bat species known from the area and, in parentheses, the number shared with "southern" Iran. There are 18 species known from "southern" Iran.

The two subspecies of *R. microphyllum* occur in close proximity across southern Iran. However, the nominate form appears to be confined to more mountainous areas, whereas the form *harrisoni* ranges through the lower coastal regions.

Rhinopoma muscatellum occurs as its nominate form through most of the "southern" region and as the form *seianum* in Seistan, and *E. nasutus* is also divided east and west across southern Iran with the form *pellucens* occurring on the Khuzistan Plain and the nominate form occurring in Baluchistan.

Two species, *E. serotinus* and *E. bottae*, are each represented by one form in the southern Zagros (*E. s. shiraziensis* and *E. b. anatolicus*) and another form in Khorasan and northwest Iran (*E. s. turcomanus* and *E. b. ognevi*). *Eptesicus serotinus* is the only species presently known to be represented in Iran by three subspecies.

Barbastella leucomelas is divided east and west in northern Iran, with the nominate form ranging through most of the Elburz Mountains and the subspecies *darjelingensis* occurring at the eastern end of this range.

The subspecies distribution of *M. emarginatus* is not clearly understood. Those from Baluchistan are the race *desertorum* and those from the southern Zagros are the nominate form, but the status of those from the Caspian area is unclear.

Above I pointed out that four of the 19 "northern" species are known only from the Caspian coastal area and another four of the 19, although widely distributed through much of the northern region, do not occur in the Caspian coastal area. These data, together with the importance of the Caspian coastal area in separating subspecies, emphasize the uniqueness of the Caspian area. Twenty-eight forms (species and subspecies) occur in the "northern" region, excluding the Caspian subregion; 14 forms occur in the Caspian subregion; and seven forms are shared by the two areas. The index of faunistic congruence between the Caspian subregion and the remainder of the "northern" region is 35.4 if subspecies are considered, but it is 54.6 if only species are considered. The Caspian coastal plain and adjacent mountains are thus shown to be a distinct subregion and perhaps should be considered a major region on an equal basis with the previously defined "northern" and "southern" areas.

14. BAT-COLLECTING LOCALITIES AND METHODS

Virtually all of the types of roosting sites used by bats in temperate latitudes are to be found in Iran. In addition, virtually all types of collecting methods have been used to obtain bats from these sites.

Some bat species are colonial, living in groups of variable size throughout the year. Others are solitary, living as individuals except during copulation and during the female's care of the young. Still other species are colonial during some seasons and solitary during others.

In most temperate regions insectivorous bats vary their roosting site from season to season. During the spring and early summer, they frequently gather into nursing colonies where the young are born and cared for. Adult males may or may not participate in the formation of these colonies depending upon the species.

Where winters are harsh and insects sparse or absent, insectivorous bats may hibernate in caves or other areas providing a constant environment or they may migrate to more favorable climates.

Caves and Crevices, Natural and Man-Made

Natural caves, *"gara"* in the Farsi language, occur throughout the Zagros and Elburz Mountains and in most other parts of the country. These caves usually are solution caves dissolved out of limestone rock, but caves resulting from faults or other origins are not uncommon. During the summer months in northern latitudes, many bat species may use small caves or the twilight zones of larger caves for overnight roosts or as nurseries. In regions where winters are cold, these areas are abandoned, and only the deeper, dark, and relatively warm inner chambers are used as hibernacula. In the south, where bats remain active all year, both shallow and deep caves may be inhabited at any time.

Within the caves, bats may be found hanging from the ceiling singly (fig. 139) or in clusters (fig. 140) of one or more species and

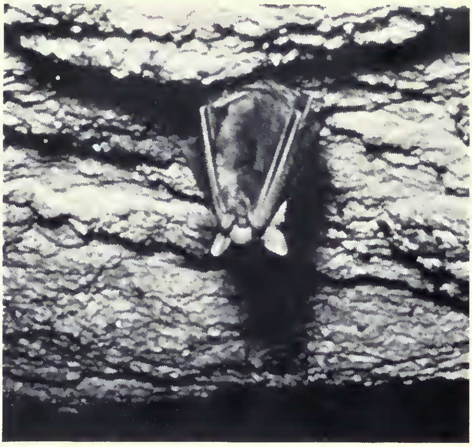

FIG. 139. A single *Myotis blythi* hanging from the ceiling of Gara Tarik. This method of hanging is typical for most Vespertilionidae. The Rhinolophidae usually also hang singly but wrap their wings around their bodies (fig. 60), rather than folding them at their sides. Rhinopomatidae hang singly but usually select nearly vertical surfaces where their forelimbs also remain in contact with the substrate.

may number into the thousands. Other species select less conspicuous locations in small vertical or horizontal cracks or in small solution holes. Such cracks and holes should be checked with a flashlight during cave inspections.

Accumulations of guano on the floor of a cave (fig. 141) indicate that it is used during the months of bat activity. Since different caves or portions of a cave may be used by the same colony in different seasons, the presence of guano piles in a cave devoid of bats during the winter implies that a return visit during the summer would be profitable. Similarly, a cave housing many bats during the winter but nearly devoid of guano probably stands unused during the summer months.

Cracks and crevices too small to be termed caves may be used as roosting sites by certain species, e.g., the *Taphozous nudiventris* colony on Basket Mountain near Rezaiyeh. It is impossible to examine thoroughly all such sites, but the bat collector should always remain alert for this possible usage and look for signs of activity such as guano piles.

Man-made caves in the form of qanats, tunnels, and rooms carved out of rock may be found all over Iran. Rooms and tunnels carved into the mountainside by man were found to house bats at several

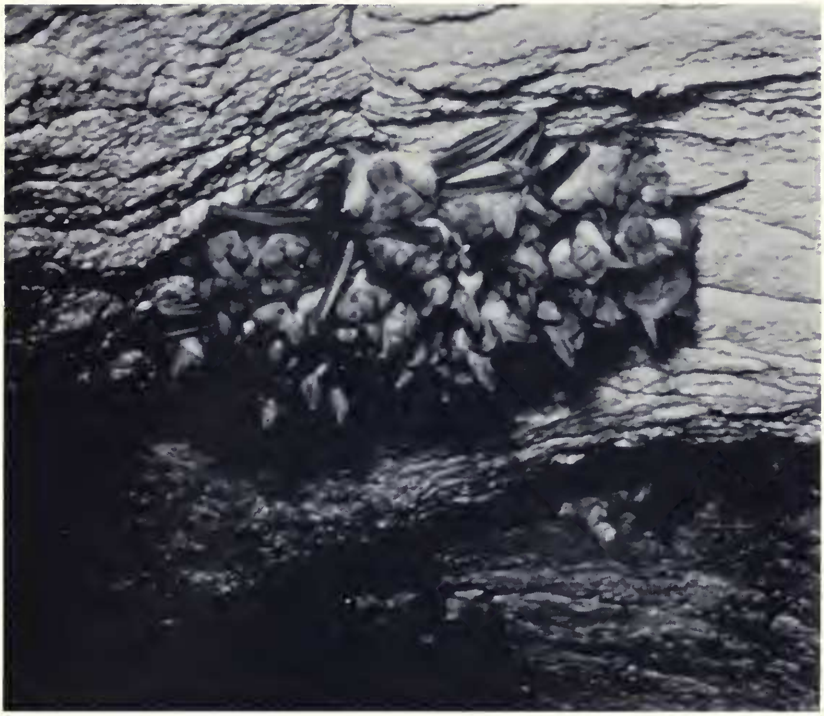

FIG. 140. A small cluster of *Myotis blythi* hanging from the ceiling of Gara Tarik. Several species form tight clusters such as this, and in favorable locations the clusters are large enough to carpet several square meters of cave ceiling. At Gara Tarik *Myotis blythi, Miniopterus schreibersi*, and *Rhinolophus mehelyi* were found in mixed clusters. Some colonial cave species, such as *Rhinopoma*, never form tight clusters.

localities by the 1968 Street Expedition (fig. 142). Frequently, these do not penetrate beyond the twilight zone but, even if they do not, roosting sites suitable for use by many species of bats may occur in cracks, niches, or solution holes.

Qanats are the underground irrigation ditches found throughout Iran. They consist of an underground tunnel connected to the surface periodically by a vertical shaft. The surface opening is surrounded by a ring of earth from the excavations. From the air a qanat looks like a row of bomb craters (fig. 143). Bats have been found inhabiting qanats in many parts of Iran.

Exploration of caves, both natural and man-made, and particularly of qanats can be dangerous and certain precautions should always be followed: 1) Never enter alone. 2) Always be certain that

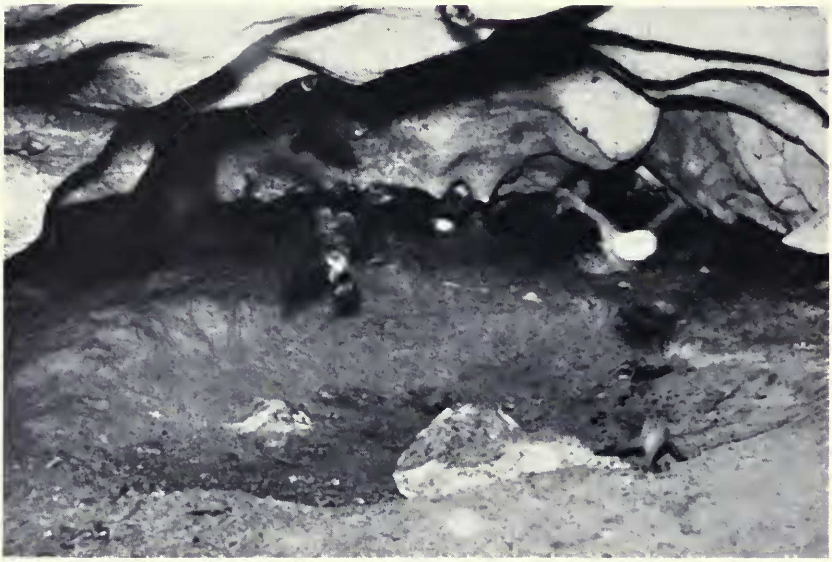

FIG. 141. Large guano pile in Gara Tarik. In some caves such guano accumulations are mined by local inhabitants for use as fertilizer.

someone on the outside knows where you are going and when you expect to return. 3) Before entering take note of weather conditions; do not enter a wet cave or a qanat if rain is threatening. Water inside can completely fill tunnels very rapidly. 4) Always take at least two sources of light. 5) In man-made caves and qanats inspect braces and shorings carefully for signs of deterioration. 6) Always look where you are going. Precipitous drops, low-hanging protrusions, or other obstacles are not uncommon. If you must wade in water, take particular care to be certain each footing is secure before proceeding. 7) If the tunnel forks or branches, turn around to see what the way you have come from looks like. If you think you might not remember how to get out, make a note or a sketch.

In addition to recording the numbers and kinds of bats in the cave, other factors should be noted. Where are the bats roosting within the cave and with what relationship to each other? Are they active or torpid? Is there guano? If so, how much, and how does the bats' position correlate to it? What are the temperature and relative humidity of each chamber containing bats? Are any air currents detectable? What is their intensity and direction? Is there water in the cave? Where and how much? Are there any signs of disturbance

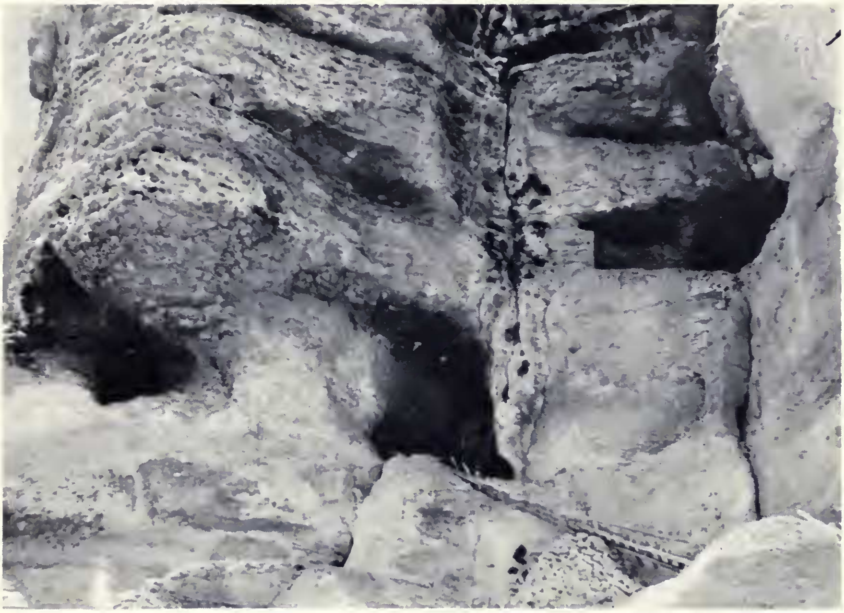

FIG. 142. Entrances and windows opening into the complex of rooms carved into the chalk cliff at Karaftu.

or use of the cave by man or other animals? Are there any other factors worthy of note?

Mosques, Tombs, and Other Structures

In all parts of the world bats have adopted human structures as their homes. Tombs and other massive structures of stone or brick are frequently used by cave-dwelling bats, and attics and towers are often used by species that might otherwise roost in hollow trees. Large tombs, caravansaries, forts, and other structures occur throughout Iran in cities and along existing or ancient trade routes far from habitation. Many of these structures are still in use, and many stand abandoned and in ruins. Bats have been taken not only from the old, abandoned structures but also from well-used ones such as the mosque in Sanandaj (fig. 144).

Bats are frequently found under the eaves and in attic-like spaces in mills, factories, warehouses, and homes. The bats enter holes in the adobe construction, roost in the spaces behind plastic facings (fig. 145), and frequently crawl in among the straw mats that underlie the roofs of most village and rural buildings.

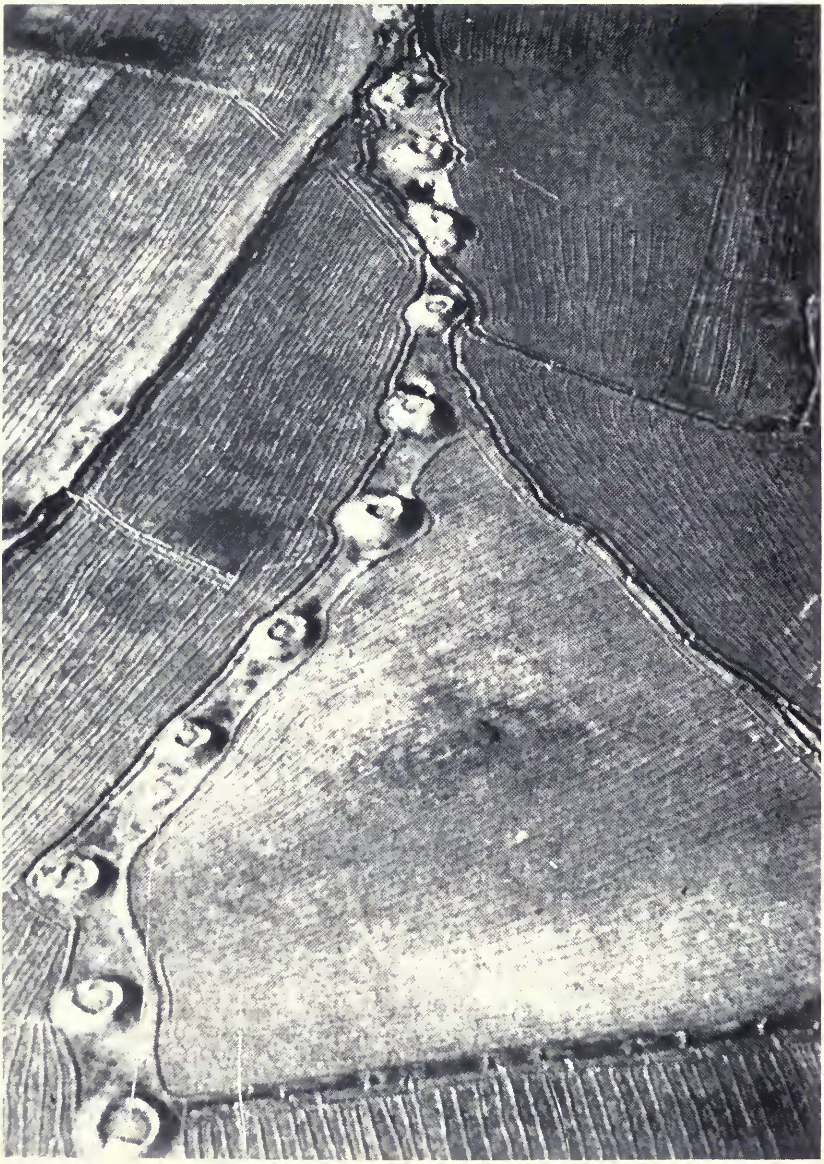

FIG. 143. An old qanat as viewed from the air.

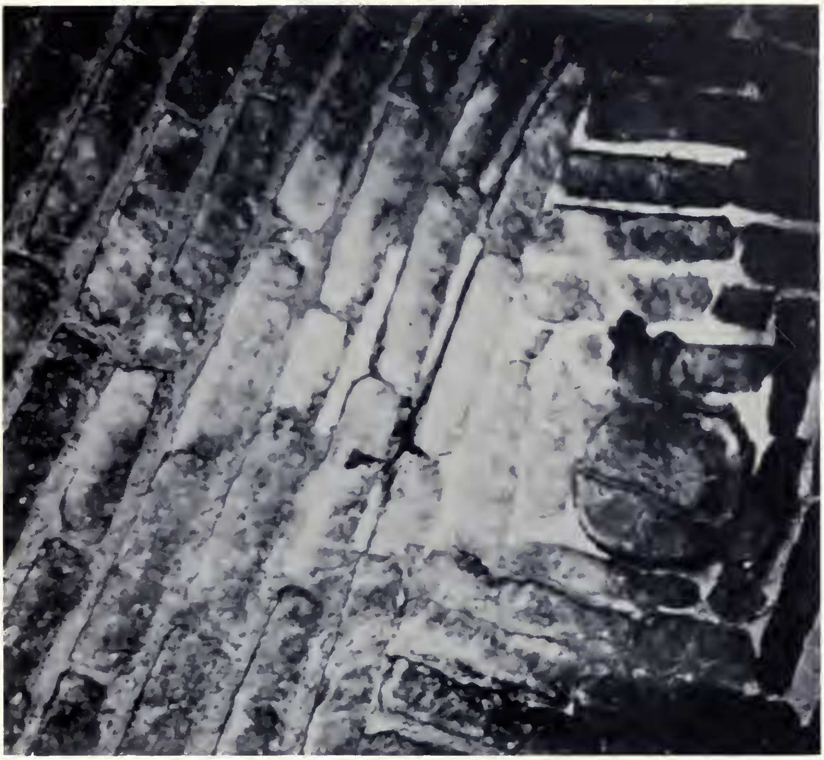

FIG. 144. Crevices between bricks, which contained *Myotis blythi*, located in a small storeroom in the mosque in Sanandaj.

Hollow Trees and Other Vegetation

Tree-dwelling bats are common in most temperate areas, but in Iran, their natural habitat, large, old trees with habitable hollows, is at a minimum. We were told that bats inhabited hollows in some large, old trees in a garden in Ilam, but we failed to verify this. We collected squirrels from large, old oaks (fig. 146) at a few locations but found no bats in any of these trees. To the best of my knowledge a bat has never been found in a hollow tree in Iran.

Some tree-dwelling bats do not require hollows but roost under loose bark or among the leaves. Natural forest still thrives on the north slope of the Elburz and along the Caspian Coastal Plain (fig. 8) and in a few sheltered valleys in the interior (fig. 12). But the oak forest that covered much of the Zagros and the pistachio-almond

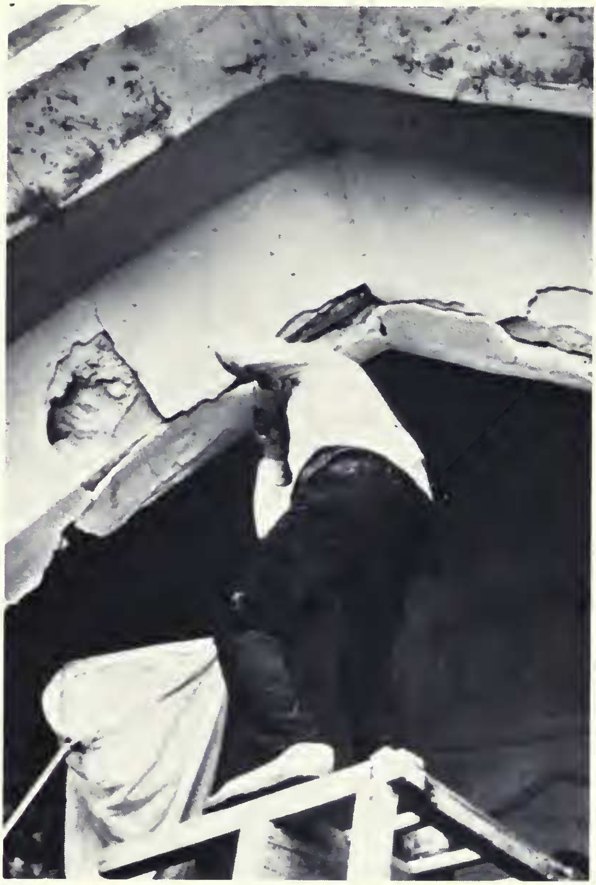

FIG. 145. Removing *Pipistrellus kuhli* from spaces behind broken plaster facing on the theological school in Jahrom.

forests that ringed the central basin are now reduced to scattered, stunted remnants (figs. 9, 10). Through most of northern Iran, stands of tall, slender poplars are cultivated near every village (fig. 147). They are grown for roofing beams and as a source of wood for other uses, but they may also provide a habitat for some tree-dwelling bats. In the southern portion of Iran, dates are cultivated as a cash crop. In other lands the dead leaves hanging down around the trunk of the date palms (fig. 148) provide a favored roosting site for bats. We found none in such locations in Iran, but we did not climb any trees to examine them.

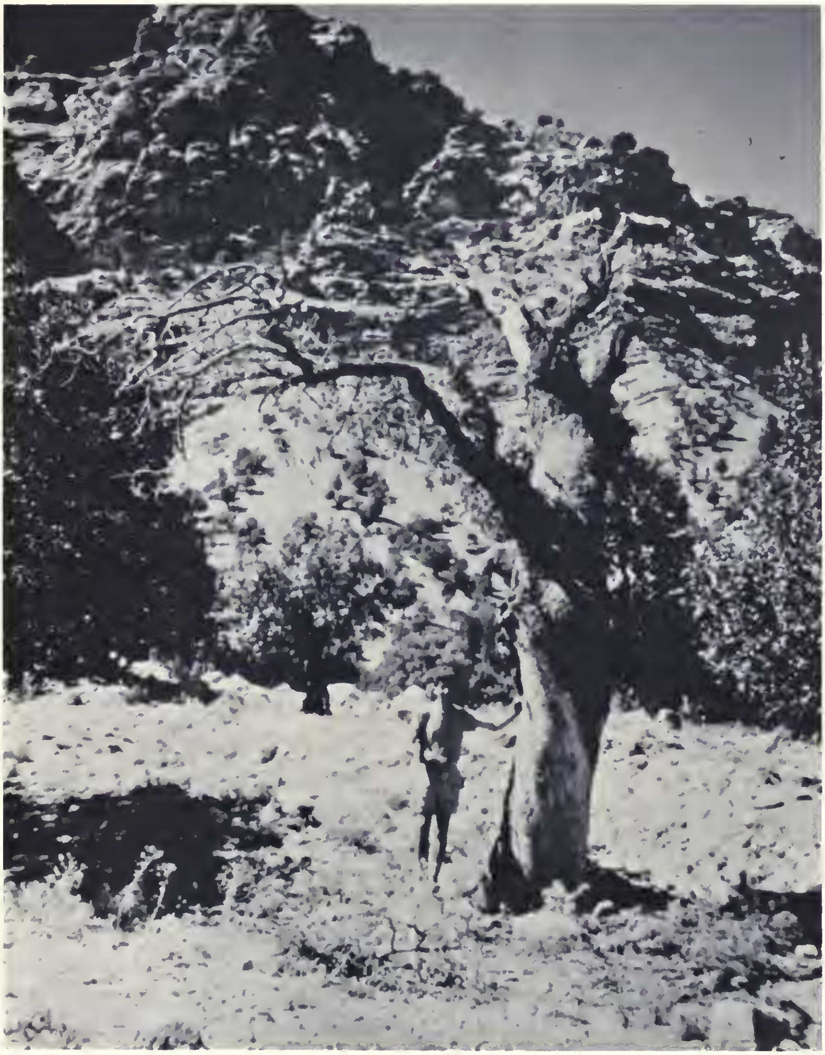

FIG. 146. Old, hollow oak tree from which squirrels (*Sciurus*) were collected near Ilam. Very few such trees were found by the 1968 Street Expedition.

Collecting Methods

Numerous methods may be used to collect bats. Most are collected from their roosting sites in caves and buildings by hand. Many Iranian species, e.g., all *Pipistrellus* and most *Myotis*, are too small to

FIG. 147. A small, sparse poplar grove in the Elburz Mountains just north of Tehran. Larger and more dense groves are common near villages and along rivers through most of Iran.

bite effectively, but many, e.g., *Rhinolophus ferrumequinum, Taphozous nudiventris,* and *Myotis blythi*, are large enough to inflict severe bites. Leather gloves should be worn to handle these large species. When the bats are too high to reach by hand or when ladders are not available, a long-handled scoop net is quite useful. On a few occasions, when even our net was not long enough, the 1968 Street Expedition collected bats from high-ceilinged caves with rat shot from a .22 revolver. When the bats are in crevices too deep to be reached by hand, a long pair of forceps is useful for extricating them. On occasion, when the bats were too deep for our forceps, we used an aerosol can of insecticide to force them toward the opening where they could be reached.

With a little practice the handnets mentioned above can also be used to collect bats flying about in a cave or structure. But for bats on the wing out of doors, the usual collecting methods are with mistnets and by shooting. Mistnets (fig. 149), available in lengths from 3 to 15 m. long, may be set across the entrance to a cave, across a narrow street between buildings, across a stream between bushes,

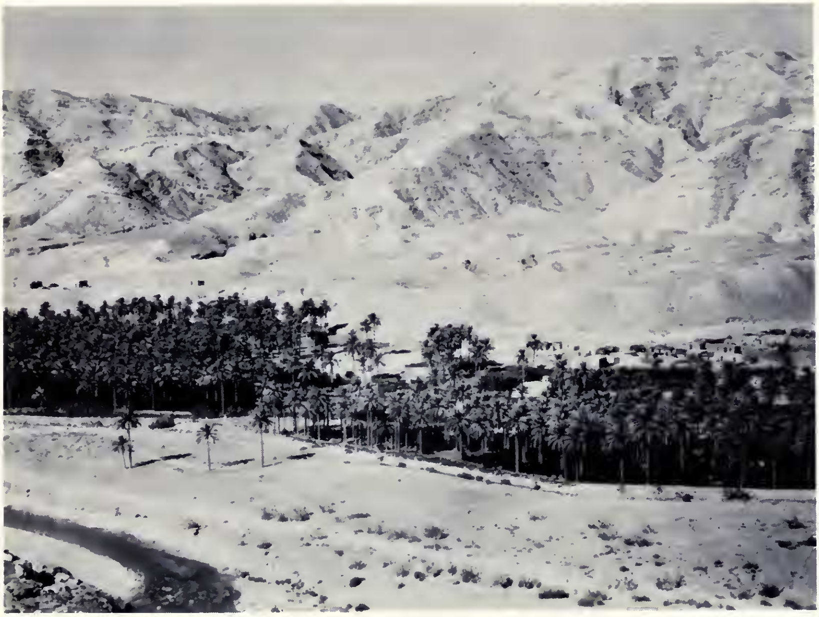

FIG. 148. Date groves along the river between Ilam and Mehran.

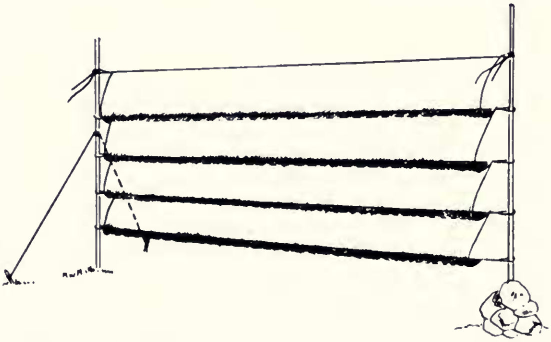

FIG. 149. A mistnet, a fine nylon net with four vertical tiers available in variable lengths to be strung between a pair of poles at a cave entrance, over a stream, or in another suitable location to capture bats.

or wherever bats normally fly along a pathway between obstacles. I have had no success in using mistnets in Iran in open areas where natural barriers do not funnel the bats toward the net. Bats must be removed from the mistnet within minutes after capture or they will chew their way out, escaping capture and ruining the net.

Because of their rapid and rather erratic flight patterns, shooting bats on the wing is difficult. Often finding the ones that have been shot is even harder. Shotguns loaded with size 8 to 12 shot are recommended. Shot larger than number 8 may give too open a pattern and may severely damage the specimen. Select as a shooting locality a site with a clear view of the western horizon and little or no vegetation in the shooting area. A relatively barren riverbank is ideal since the bats usually come to drink at dusk immediately after leaving their roosts. The bats may be shot by the fading sunlight, but after dark a powerful spotlight, such as that often mounted on a truck, can be used to sweep the sky for them. Bat-shooting requires at least two persons, one to shoot and one to watch the hit bat closely as it falls to the ground, so that it can be located and retrieved. Many of the rarest species known from Iran have been obtained only by shooting.

15 FAUNAL ASSEMBLAGES

In the preceding species accounts all Iranian bat records are listed for each species. However, bat collectors should also be interested in knowing which species occur together at each locality. I have therefore summarized the bat-collecting activities at each geographic locality in the following sections on each province. Only three records cannot be at least tentatively assigned to a province: Peters (1866) reported *Plecotus* from "Persia," and De Filippi (1865, p. 343) and Blanford (1876, p. 23) both reported *Pipistrellus kuhli* from "Southern Persia."

Bushehr Province (BSH)

Bushehr Province occupies a narrow strip of southwestern Iran along the east side of the Persian Gulf. It is approximately 450 km. in length but only about 100 km. wide at its broadest point. Elevations range up to 1,961 m. but most of the land is below 500 m. Its major city is the port of Bushehr.

The bat fauna of Bushehr Province is poorly known. Only six species have been reported and these have all been taken within 65 km. of the city of Bushehr.

Anderson (1881, p. 113) reported a male *Asellia tridens* from Sulzabad, Bushehr, that had been cataloged at the British Museum (Natural History) on 15 August 1879. A male *Rhinolophus ferrumequinum* was collected in Bushehr on 26 November 1883 by Mr. W. D. Cumming of the Persian Telegraph (Murray, 1884, pp. 97-98). A female *Tadarida teniotis* and a specimen of *Triaenops persicus* from Bushehr are in the collections of the British Museum. Both tags name "Miss Wilson" as the collector, but neither gives a date or any further locality data. An immature male *T. teniotis* was collected in Bushehr during the summer of 1968 by Dr. A. Farhang-Azad.

Etemad (1969) collected *Myotis emarginatus* and *Pipistrellus kuhli* from Konar-Takhteh, a town northeast of Bushehr on the road to Kazerun, in the springs of 1965 and 1966 respectively. Lay (1967, pp. 51-52) collected at Ahram, a town about 61 km. SE Bushehr, in early January, 1963. He found that *P. kuhli* "frequented the villages and date groves at twilight" and found that "at dusk many *Triaenops persicus* began their crepuscular and nocturnal flights" near the hole-pocked clay facings at the base of the jagged mountains that rose vertically from the narrow coastal strip.

Central Province (CEN)

The Central Province, Ostan-e-Markazi in Farsi, was called Tehran Province by Lay (1967). It lies northwest of the geographical center of Iran, where it extends from the crest of the Elburz Mountains south and west across the northwestern corner of the central deserts and into the eastern flanks of the Zagros.

Tehran, the national capital, is also the provincial seat of government. Other major cities include Qazvin and Karaj at the foot of the Elburz, Qom and Kashan at the edge of the Dasht-e-Kavir, and Arak on the east edge of the Zagros.

Although Tehran is the political, economic, and scientific center of modern Iran, the bat fauna of the Central Province is not as well known as that of several more peripheral provinces. Early collectors in particular did very little work in this area, even though it lies at the junction of both ancient and modern trade routes around the northern and southern ends of the central deserts. Twelve species of bats have been reported from a total of eight localities.

Only three species are known from the capital city. Col. A. C. Bailward collected a male *Pipistrellus kuhli* there on 15 April 1907 (Thomas, 1907), and two more of this species were collected in Tehran in 1906 by Hadji Abdul Kerim. An immature male *Myotis mystacinus*, collected in Tehran by K. Krell on 23 July 1952, is in the Stuttgart Museum. In the summer of 1965 Etemad (1969) collected a male *Barbastella leucomelas* from a home in Tehran.

Along the Elburz to the north and west of Tehran, Lay (1967, p. 145) reported a specimen of *Eptesicus serotinus* from Karaj, and De Filippi (1865) reported a bat from Qazvin that is probably also *E. serotinus*. To the east, Etemad (1967, 1969) collected *Myotis blythi* in September 1962 from Rood-Afshan Cave, 105 km. E Tehran in the Elburz Mountains.

At Varamin, a town 37 km. SE Tehran, Etemad (1967, 1969) found a nursery colony of *Taphozous nudiventris* hanging under the ceiling of a large tomb known as the Castle of Aladdin on 26 June 1966. In the autumn of the same year he found only one of this species hanging from a wall in this structure.

The Iran Public Health Research collections include one male and one pregnant female *Rhinolophus blasii* taken at Afghan Cave, 110 km. SE Tehran on 23 April 1969 and one male *Vespertilio murinus* taken at Qom on 24 April 1969 by Farhang-Azad.

Two caves near Mahallat in the Zagros Mountains 110 km. SW Tehran have been found to house six species of bats. At Baba-djabar Cave in Mahallat, Etemad (1964, 1967) has collected *Rhinolophus ferrumequinum* and *R. blasii*. At Azad Khan Cave near Mahallat he has collected *Barbastella leucomelas* (Etemad, 1964), *R. ferrumequinum, R. hipposideros, Myotis emarginatus, Miniopterus schreibersi* (Etemad, 1967), and *M. blythi* (Etemad, 1969).

Chahar Mahal and Bakhtiari Province (CMB)

Chahar Mahal and Bakhtiari Province occupies a small section of the central Zagros Mountains. This mountainous province is entirely above 1,500 m. and has several peaks over 4,000 m. The major towns are Shahr Kord in the north and Borujen in the south.

Chahar Mahal and Bakhtiari Province has been visited only twice by mammal collectors. These two expeditions collected nine species of bats from a total of four localities.

A group of students from Aberdeen University visited the Kuh Rang area in 1965. They collected *Rhinolophus euryale, R. mehelyi, R. blasii,* and *Plecotus austriacus* from the Shah Abbas Caves near Kuh Rang and *Myotis blythi* at Jangeh, about 40 km. from Kuh Rang on the Shahr Kord road.

The 1968 Street Expedition visited the Kuh Rang area in late September. On 25 and 26 September 1968 we shot seven *Pipistrellus pipistrellus* and one *Myotis nattereri* as they flew above our camp, which was at an elevation of 2,592 m. in a broad stream valley (fig. 150), about 8 km. N the village of Kuh Rang. Several bats were seen flying each evening even though temperatures ranged well below freezing each night. We inquired about caves from the local inhabitants but were directed only to two small shallow caverns that did not penetrate beyond the twilight zone. We did not locate the Shah Abbas Caves that the Aberdeen University group had visited.

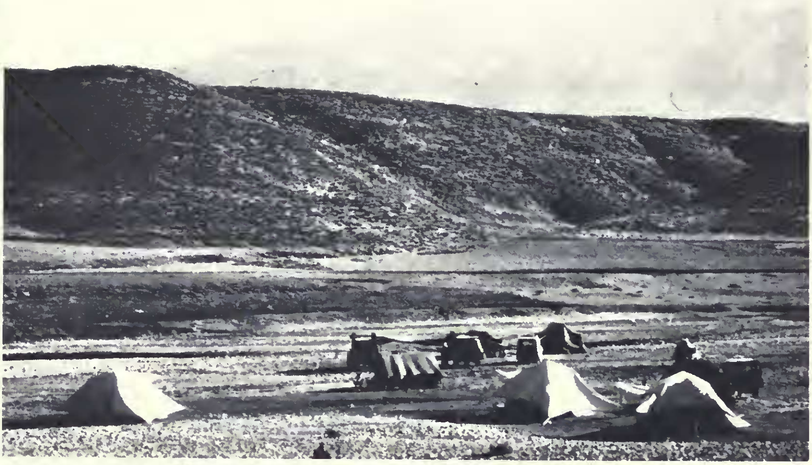

Fig. 150. Camp near Kuh Rang. *Myotis nattereri* and *Pipistrellus pipistrellus* were shot at this campsite by the 1968 Street Expedition.

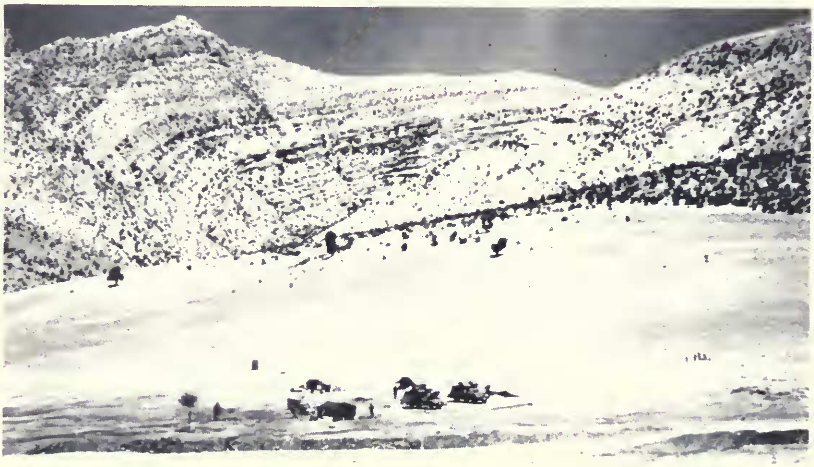

Fig. 151. Camp near Sar Dasht. *Vespertilio murinus*, *Pipistrellus pipistrellus*, and *P. savii* were shot at this campsite by the 1968 Street Expedition.

On 28 September 1968 we visited a cave 24 km. SW Borujen. The cave had many "crawlable" passages that contained numerous horse, artiodactyl, and carnivore bones and showed many signs of porcupines (droppings, quills, and digging), but no bats were present. However, several sizeable (about 20 cm. deep) piles of bat droppings near the entrance indicate that the cave is used by bats at some time of the year.

On 29 September we set two mistnets over a jube (fig. 151) near the village of Sar Dasht, a few km. SW Lordegan. Although the nets were left up for three nights and numerous bats were seen flying along the jube at dusk, none were collected by mistnet. On 1 October we shot three of the many bats seen flying. These included one each of *Vespertilio murinus, P. pipistrellus,* and *P. savii.*

East Azarbaijan Province (EAZ)

East Azarbaijan Province occupies much of northwestern Iran, extending from the western slopes of the Elburz Mountains on the west of the Caspian Sea to the eastern shores of Lake Rezaiyeh, and from the Soviet border in the north to well beyond 37° N latitude in the south. The province is a complex area of mountains and broad valleys bridging the space between the northern ends of the Zagros and Elburz mountain systems. It is dominated by volcanic cones including Mt. Sabalan, 4,814 m., and Mt. Sahand, 3,712 m. In the northeastern corner of East Azarbaijan Province a small portion of the Moghan Steppe penetrates the Iranian border from the USSR.

Tabriz, the capital and largest city of the province, is located near the center of the province, and several other cities and large towns are found all through the fertile valleys. Clockwise from the northwest, these include Marand, Ahar, Ardabil, Sarab, Mianeh, and Marageh.

The bat fauna of this large and ecologically varied province is virtually unknown. Collections have been made from only three localities in the entire province. Six species were found at one locality, two at another, and three at the third.

On 21 August 1961 a group from the University of Wales visited the Sulphur Caves near Kutur Su on the north side of Mt. Sabalan. All of the 17 specimens they collected were found dead, and several were mummified. The bats had apparently been overcome by sulphur fumes. The series included one *Myotis blythi*, two *M. nattereri*, three *M. mystacinus*, one *Eptesicus serotinus*, seven *E. bobrinskoi*, and three *Plecotus austriacus* (Harrison, 1963). The *E. bobrinskoi* are particularly interesting since this is the only record for this species outside the USSR and since all Soviet records are from the opposite side of the Caspian Sea.

In 1969 Iran Department of Environment personnel collected three species of bats on Quyn Daghi Island in Lake Rezaiyeh. These included a *P. kuhli*, collected on 14 September, a *P. savii* collected on 11 November, and a *Miniopterus schreibersi* collected on 6 November. Felten (in press) reported two specimens from Tabriz: a male *Pipistrellus kuhli* collected in the fall of 1970 and a female (?) *Rhinolophus blasii* collected during March, 1975.

Esfahan Province (ESN)

Esfahan, or Isfahan, Province is very near the geographic center of Iran. It extends from the eastern Zagros eastward into the heart of the central deserts. On the north it is bordered by Central and Semnan provinces and on the south by Fars and Yazd provinces. The western portion of Esfahan Province is very mountainous. The city of Esfahan, or Isfahan, is located in a large basin between the Zagros proper and the Karkas Mountains, the easternmost ridge of the Zagros system at this point. East of the Karkas the province includes the southern edge of the Dasht-i-Kavir and the northwestern corner of the Dasht-e-Lut.

Esfahan, one of Iran's major cultural and artistic centers, is the capital and largest city of the province. West of Esfahan several small cities, including Golpayegan, Khunsar, Najafabad, and Shahreza, extend along the flanks of the main Zagros range. East of Esfahan a few large towns, including Ardestan and Nain, flank the Karkas range, but east of these only small towns and villages dot the steppe and desert fringes.

The bat fauna of Esfahan Province is virtually unknown. Two localities have yielded only three species. On 14 May 1905 Mr. R. B. Woosnam shot two *Myotis blythi* and one *Pipistrellus pipistrellus* from among the poplar trees near the village of Darband, 50 miles W Esfahan, 1,982 m. elevation. These include the holotypes of *P. p. aladdin* and *M. b. omari* (Thomas, 1905).

On 21 December 1962 Lay (1967, p. 74) collected a single male *Rhinolophus ferrumequinum* from the tunnel of a qanat near the village of Galatappeh about 58 km. NNE Esfahan. A check of two small limestone caves in the area yielded no bats.

Fars Province (FAS)

Fars is one of Iran's largest provinces. Situated in the southwestern portion of the country, it encompasses most of the southern ends of the main Zagros ranges. Elevations range from peaks as high as 3,663 m. in the north to less than 500 m. near the coast on the west and south. Fars is separated from the Persian Gulf only by the narrow Bushehr and coastal provinces.

Shiraz, one of Iran's major cities, is the capital and largest city of the province. Other small cities and large towns include Abadeh and Abarqu in the north; Kazerun in the west; Firuzabad, Fasa, Neyriz, Jahrom, and Darab in the midsouth; and Lar in the far south.

The bat fauna of Fars is better known than most other Iranian provinces. Twenty species have been collected from a great variety of habitats and locations. However, the higher mountains north of Shiraz and the western and southern portions of the province have been virtually unworked.

From 1870 to 1872 W. T. Blanford and Major St. John collected mammals in Iran including many from Shiraz. Major St. John shot several *Triaenops persicus* on a May evening as they flew just outside the walls of Shiraz, 1,449 m. elevation. When he was later in Shiraz, Blanford shot all the bats he could but failed to obtain any further *T. persicus* (Blanford, 1876, p. 19). St. John's series includes the cotypes of this species. In 1870 St. John collected *Myotis blythi* and *Pipistrellus kuhli* from Shiraz, and he and Blanford collected *Eptesicus serotinus* from that city. Blanford (1876, p. 21) said that he found *E. serotinus* "abundant close to Shiraz. I shot several in the evening just outside the city." Of this series only the holotype of *E. serotinus shiraziensis* is to be located in the collection of the British Museum. Dobson (1871, p. 461) and Blanford (1876, p. 22) also reported *P. coromandra* collected by Major St. John at Shiraz. However, since this is well outside the known range of this species and since no specimens can be found to document the record, I must consider these bats to have been misidentified.

On 3 May 1902 H. F. Witherby collected a female *P. kuhli* at Shiraz (Cheesman, 1921, p. 575). Between 10 February and 15 August 1919 Col. J. E. B. Hotson collected numerous bats from that city (Cheesman, 1921). On 21 and 23 June he collected one adult female and eight immature *Rhinolophus ferrumequinum*. The adult is the holotype of *R. f. irani*. On 22 June he collected three male and one female *M. blythi* from a flour mill 2 miles from Shiraz. One of these is the holotype of *M. b. risorius*. Between 16 April and 20 July he collected six *P. kuhli*, all females, and between 17 July and 8 August he collected six *P. pipistrellus*, three of each sex. Between 14 and 16 June 1920 Hotson collected seven more *M. blythi* from the same flour mill mentioned above, and he collected one additional *P. kuhli* on 18 June. Etemad (1969, p. E4) reported a specimen of *Rhinopoma microphyllum* from Shiraz taken in July, 1966.

The 1968 Street Expedition visited Shiraz in early October. On the evening of 6 October we shot a *P. kuhli* from among the many bats observed flying over an open field on the northeast edge of the city adjacent to the municipal campground. The bats had begun to fly at about 5:50 P.M. while it was still quite light. On 7 October we visited two "caves" near a small salt flat about 24 km. SE Shiraz. The first of these was only about a meter deep but was a long vertical crack about 10 cm. wide and 15 m. tall. Considerable guano was accumulated at the base of the crack but no bats were seen. The second cave penetrated the cliff to a depth of about 10 m. and was almost 2.5 m. tall but did not penetrate past the twilight zone. Again the floor was covered with guano but no bats were seen. Later in the same day we visited a village southeast of Shiraz where bats were common in the straw substructure of the building roofs. We used forceps, aerosol insecticide, and handnets to collect four *P. kuhli* from this area. At about 5:40 P.M. bats began to emerge from holes and cracks in buildings all over the village, and within moments the still fully lit sky was full of the flying bats. Most were judged to be *P. kuhli* by size and flight pattern.

On 1 July 1920 Col. Hotson collected a female *P. kuhli* at Band-e Amir about 40 km. NE Shiraz, and at dusk on 3 October 1968 the Street Expedition shot six *P. kuhli* and three *Myotis capaccinii* as they flew over a pond in the garden adjacent to the ruins of Persepolis about 60 km. NE Shiraz.

In early July 1920 Col. Hotson collected two *P. kuhli* and one *E. serotinus* from Zarghum in northern Fars Province. These and the two *Nyctalus leisleri* collected by the Iran-WHO Epidemiological Research Team in 1969 at Chelzari, 40 km. SE Abadeh (Farhang-Azad, 1970) are the only records of bats from the mountainous northern portion of Fars Province.

From eastern Fars Province, Blanford (1876, p. 23) collected a single *P. kuhli* at Neyriz in the early 1870's. The Smithsonian Institution's team collected two *R. microphyllum* from 8 km. W Estahbanat on 7 July 1965, two from 11 km. NW Darab on 10 and 11 July 1965, and one from 2 km. SE Mansorabad on 24 July 1965, and the team shot one *Eptesicus bottae* 11 km. NW Darab on 10 July 1965.

The 1962 and 1968 Street Expeditions collected at several localities in south-central Fars Province. Lay visited Jahrom from 31 December 1962 through 2 January 1963. He found considerable guano and seven mummified *Asellia tridens* in seldom-used or abandoned buildings around the city but found no live bats. Residents told him that the bats return every summer (Lay, 1967, p. 139). He also visited numerous caves on the walls of canyons that dissected flat-topped limestone mesas about 4 km. W Jahrom. From these caves he collected *R. aegyptiacus* and *R. muscatellum* (Lay, 1967, pp. 81-82).

The 1968 Street Expedition visited Jahrom in early November. We searched two houses, a caravansari, and a mosque for the signs of *A. tridens* Lay had reported. We found considerable guano but no mummies or live bats. On 8 November we visited a Moslem seminary, where we found *P. kuhli* inhabiting the spaces behind loose chunks of plaster in the walls around the central courtyard (fig. 145). We collected 10 of these with forceps and handnets and saw at least 10 more that we were unable to catch.

On 9 November we attempted to mistnet bats at the caravansari mentioned above. None were taken but three were seen flying in and out of crevices in the walls. These were probably *P. kuhli*. I also examined a large, wet cave high in the mountain just southeast of the city. The cave did not penetrate past the twilight zone, and no signs of bats were found. However, as we came back down the mountain at dusk, we saw several bats flying along the mountain canyon. These were making very audible clicking and squeaking noises as they flew and were not *P. kuhli*. Unfortunately, none were collected.

On the evening of 9 November we shot one *P. kuhli* as it flew over the garden in which we were camped on the southeast edge of Jahrom. A *P. pipistrellus* was shot at the same locality on 11 November. On the evening of 8 November we saw many bats flying over the road about 3.2 km. W Jahrom. We shot seven, all of which proved to be *P. kuhli*.

On 8 November we began looking for the caves from which Lay had collected *Rousettus aegyptiacus*, but we found no mesas such as he described 4 km. W Jahrom. However, about 6.4 km. to the northwest we did find an area of deeply dissected flat-topped hills. The walls of the canyons in these hills contained many small, hot caves. We found three *Rhinopoma muscatellum* in the cave we explored and collected one of these. On 12 November we visited a small area of dissected flat-topped hills about 5.3 km. SW Jahrom (fig. 30) to continue our search for Lay's *R. aegyptiacus* cave. We explored a large canyon in these hills that ran south toward the mountains. The walls of the canyon were pocked with hundreds of small, hot caves, none of which penetrated very deeply. Many of these harbored *R. muscatellum*, and two specimens were collected. Approximately 1.5 km. up the canyon we found a very tall but shallow cave on the east wall. The ceiling had several high, dark domes, but the rest of the cave was quite light. One of the domes contained a single *R. aegyptiacus* which was collected. Guano piles covered the floor under three of the domes, but only the single bat was present at the time of our visit. We did not find the cave that matched Lay's description. On 14 November we again searched the area northwest of Jahrom. Again we found numerous *R. muscatellum* in the many small caves and collected four specimens. Again Lay's large cave and more *R. aegyptiacus* were not found.

On 10 November 1968 we visited the village of Tadovan, about 65 km. N Jahrom on the Shiraz highway. Just north of the village a tributary passes through a deep cleft in a ridge and forms a canyon (fig. 152). Canae Gabru Cave (the name means "house of the fire worshippers") is located high on the west-facing cliff. Portions of the cave entrance and many other clefts in the cliff wall adjacent to and across from the cave are walled up with rocks. These are too high on the cliff face to have been used as livestock pens and are probably remnants of human habitation.

Canae Gabru is a large and complex cave inhabited by many species of bats. Figure 153 is a map of this cave modified from one drawn during our visit. No portions of the cave were actually measured so all dimensions are approximate. Reference numbers in the following discussion refer to the numbered areas on the map. Immediately inside the entrance is a large pit about 6 m. wide and almost as deep (#1 on map). A large dome over the pit was darkly stained and there was quite a bit of guano in the pit. No bats inhabited this dome at the time of our visit, but it is apparently a major roosting area for some species during the summer months. We found approximately 100 *Rhinopoma* inhabiting the cave, and most of

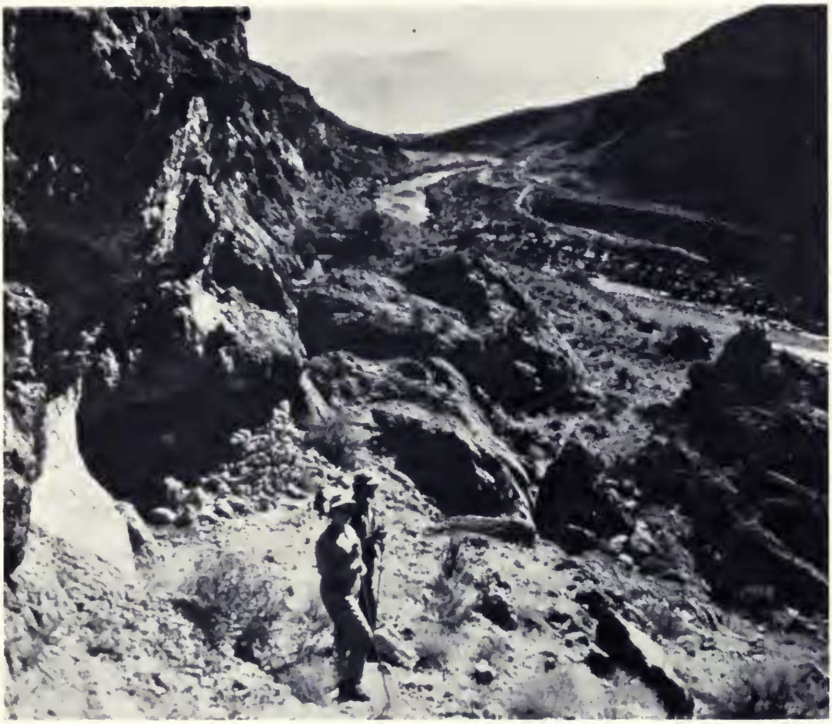

FIG. 152. Canyon north of Tadovan. The entrance to Canae Gabru Cave is in the canyon near where the photo was taken.

these were in area #2 on the map. When we began to collect them, they flew about but were reluctant to leave the cave; many flew to area #3 where none had been upon our arrival. The twilight zone is left in the passageway between the pit and area #4. In area #4 we found many more *Rhinopoma* as well as several geckos and large spiders. It is likely that the *Rhinopoma* do not normally inhabit this area of the cave but were driven there by our collecting activity in area #2. We collected 32 *R. microphyllum* and 11 *R. muscatellum* from areas 2, 3, and 4.

Area #5 is a small, domed room with a temperature of 75°F and a relative humidity of 91 per cent. Nine *Rhinolophus euryale,* four *R. blasii*, and one *M. capaccinii* hung in deep torpor from the ceiling of this chamber, and all were collected. Area #6 is a tall wet chimney. We saw two *Rhinolophus* sp. flying here, but they flew above our reach and then out of sight. In area #7 we saw two or three more

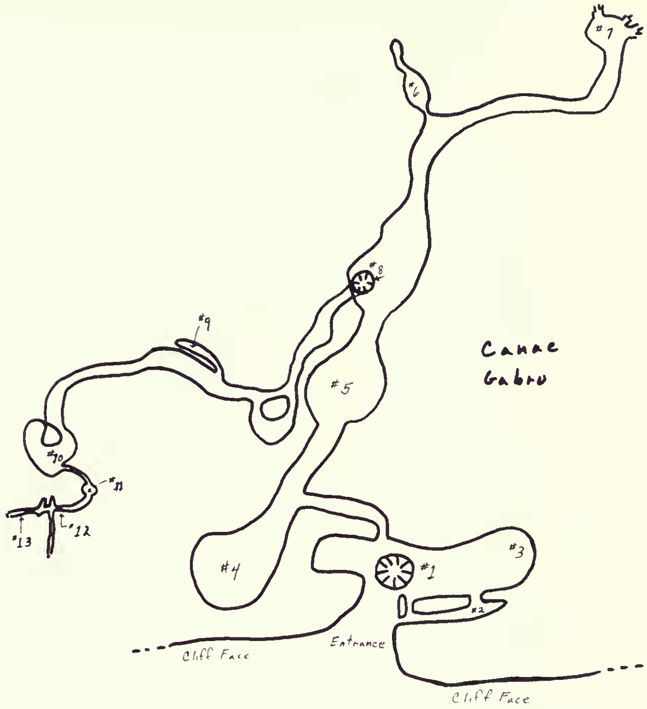

FIG. 153. Diagram of Canae Gabru Cave redrawn from field notes. For an explanation of the numbered areas see the text.

bats flying but failed to collect these. This area was quite warm (77°F) and also had a relative humidity of 91 per cent. Three apparently crawlable passages branch off of this area, all with a wet clay floor. We did not explore these.

On one side of area #8 a pit in the floor leads to a crawlway that descends to a small passage that is just tall enough in which to walk upright. Area #9 is a very tall, narrow passage (probably a fault crack) that contained several active *Rhinopoma*. Area #10 is a small, almost circular chamber in which we found and collected a mouse, *Calomyscus bailwardi*. Its nest ball was also found in a crack in the rock. At area #11 we collected one *R. blasii* from where it hung in torpor in a small, cool dome. At area #12 the passage narrowed to a small crawlway that had a cold breeze passing through it. Two *R. hipposideros* were collected from where they hung in deep torpor in the exposed portion of the crawlway. Beyond area #12 the passage was intersected by two very tall, very narrow fault cracks, and at #13 the passage itself became a fault crack that extended up further than we could see. Numerous *Rhinopoma* were flying about in these cracks and three *R. muscatellum* were collected from this area. We did not go beyond this point.

On 1 January 1963 Lay visited a cave about 2 km. NW (not NE) the village of Ahmad Mahmoudi (Lay, 1967, p. 82). He found it inhabited by eight *R. aegyptiaca*, 15 to 20 *R. muscatellum*, and a single *R. microphyllum*. The 1968 Street Expedition visited this same cave on 15 November. We found its configuration and condition to be essentially as Lay described them. At the time of our visit, the cave was inhabited only by about 12 *R. muscatellum*, five of which were collected.

At the village of Hormud-e Bagh we visited a mosque (fig. 65) on 16 November 1968. We were told that bats had commonly hung from the rafters of the lower story of this structure until about two months previously when it had been treated liberally with DDT. No bats were seen and the odor of DDT still permeated the building.

In western Fars Province bats have been collected from several localities in the vicinity of Kazerun. Lay (1967, p. 59) saw many *P. kuhli* hawking over Lake Famur after nightfall. Each night of their stay (27 December 1962 through 4 January 1963) they heard, "but were only able to glimpse, large bats that behaved in the manner of freetails, and which may have been *Tadarida teniotis*" (Lay, 1967, p. 61). On 28 December 1962 they collected about 50 bats from a well near their Lake Famur camp about 5 km. SE Pol-i-Abgineh (Lay, 1967, p. 61). This sample from this site included 30 *M. capaccinii* and six *Miniopterus schreibersi*. On 4 January 1963 Lay (1967, p. 61) found "the mummified remains of 50 to 100 *Asellia tridens* in a pile on the floor of an abandoned mud house located" south of Lake Famur near Rabatak. Nine of these were collected.

H. F. Witherby collected one *P. kuhli* at Kamaraj near Kazerun on 17 June 1902. The Smithsonian Institution team collected 14 *R. microphyllum*, two *R. hardwickei*, four *R. hipposideros*, one *A. tridens*, and two *M. capaccinii* from 10 km. SE Kazerun between 17 and 20 November 1963.

Etemad (1967) reported specimens of *A. tridens* and *P. kuhli* from Kazerun in his collection. I have reidentified this *P. kuhli* as *P. pipistrellus aladdin*. The IPHR collections include a prevolant male, *A. tridens*, collected at Kazerun in 1968 and a female *M. emarginatus* collected at Kazerun in June, 1968 by Farhang-Azad.

"Nineteen kilometers northwest of Kazerun the ruins of the ancient city of Shahpur crumble on the spot where it once guarded the entrance to a narrow (6.5 km.), long cut between two high mountains. Near the top of the northwest rim (467 m. above the river) and midway up along the valley [fig. 154], Shahpur's huge cave surveys the entire valley from a strategic position" (Lay, 1967, p. 60). Shahpur Cave is one of the largest and most majestic caves in Iran, and it harbors a large and varied bat fauna. To date seven species are known from it. Etemad (1967, p. 276) reported *R. ferrumequinum* from the cave, and it was visited by both the 1962 and 1968 Street Expeditions.

Figure 155 is a map of Shahpur Cave modified from one that I drew during our visit. No field measurements were taken and all proportions are estimated. Reference numbers in the following discussion correspond to numbers on the map. The entrance chamber (#1) is dominated by a huge statue of King Shahpur (fig. 156) that looks out over the valley below. The entrance is 44 m. wide and 15 m. high. From it the passage slopes down through a room 91 m. long, 45 m. wide, and 30 to 45 m. high (Lay, 1967, p. 60), where "water dripping from the ceiling accumulated in ancient grooves cut by man into the limestone floor." These grooves channeled the water into several large rectangular storage pools in a large rotunda-like room (#2). Area #3 is the large chamber about 30 m. in diameter and 23 m. high where on 29 December 1962 Lay (1967, p. 60) found about 500 *R. mehelyi* and *M. schreibersi*, "in a ratio of approximately three of the former species to one of the latter." On 9 October when the 1968 Street Expedition visited this cave we found the ceiling of this area to harbor about 130 *M. schreibersi* (fig. 157) but no *Rhinolophus*. In area #4 the 1968 Street Expedition found numerous *M. schreibersi*, three *M. capaccinii*, two *R. hipposideros*, and two *R. ferrumequinum*. All bats were in torpor as we approached, though this area at the top of the slope was quite warm.

In area #5 one *R. ferrumequinum* and one *R. hipposideros* hung in torpor from the ceiling. Here, as elsewhere in the cave, the *R. hipposideros* hung from the tips of tiny stalactites, whereas the *R. ferrumequinum* hung directly from the ceiling. In areas #6 and #7 the floor was littered with rock fallen from the ceiling, and *M. schreibersi* dotted the ceilings of both areas. Area #7, like area #4,

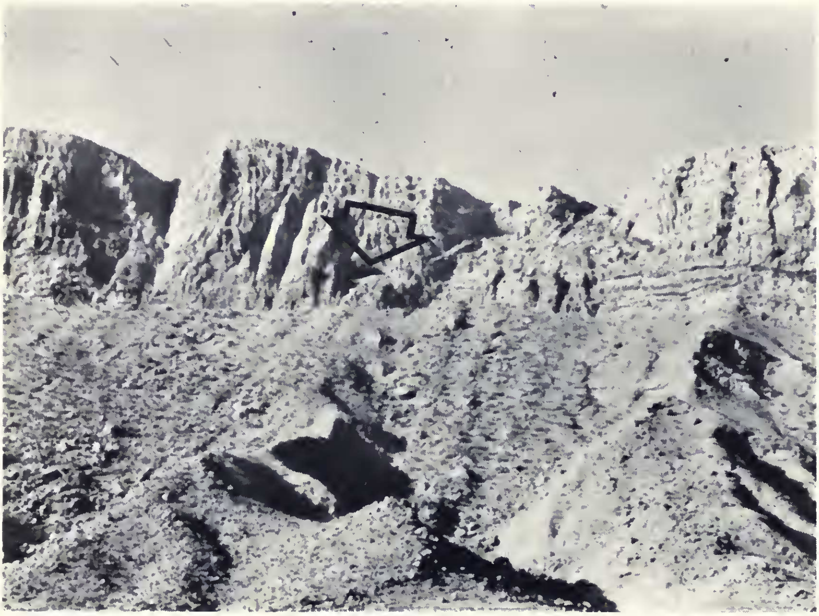

FIG. 154. Shahpur Cave is located at the base of the cliff, above the talus slope, near the top center of the photograph (arrow).

was considerably warmer than the rest of the cave. Area #8 was very rich in cave formations and two more *R. hipposideros* hung from the tips of stalactites. In area #9 a *P. pipistrellus* hung inside the hollow center of a broken stalactite. I did not identify the small, hot (80°F) chamber in which Lay (1967, p. 61) observed 30 *M. capaccinii*.

The 1962 expedition collected 14 *R. mehelyi* and eight *M. schreibersi* from Shahpur Cave. The 1968 expedition collected three *R. ferrumequinum*, five *R. hipposideros*, three *M. capaccinii*, one *P. pipistrellus*, and 34 *M. schreibersi*. In 1968 the *M. capaccinii* and two of the *R. ferrumequinum* were collected with handnets. All of the others were shot from where they hung with a .22 pistol loaded with rat shot.

Shahpur Cave is apparently a major hibernaculum for *R. mehelyi, M. capaccinii,* and *M. schreibersi*, but it is apparently used as a roosting spot by several other species. The absence of any significant accumulations of guano indicates that it does not house a very large population of bats during the summer months.

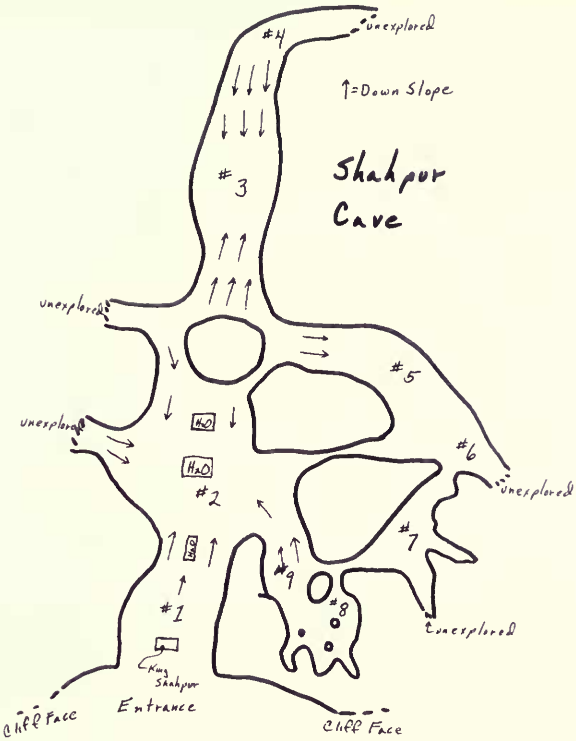

FIG. 155. Diagram of Shahpur Cave redrawn from field notes. For an explanation of the numbered areas see the text.

Gilan Province (GIL)

Gilan Province straddles the Elburz Mountains southwest of the Caspian Sea. It extends as a narrow band between mountain crest and coastline from the Soviet border around the southwest corner of the Caspian to Ramsar. Rasht is the largest city and provincial seat of government. Bandar-e Pahlavi, Lahijan, and Fowman are other major communities.

Seven species of bats are known from Gilan Province, most by only a few specimens and some by only a single individual. Gmelin (1774) reported *Rhinolophus ferrumequinum* from the Elburz Mountains and Lay (1967, p. 138) restricted this to the vicinity of Rasht. Woosnam collected two *Myotis blythi* from the "post houses" in the Elburz Mountains north of Rasht on 15 May 1907 and two

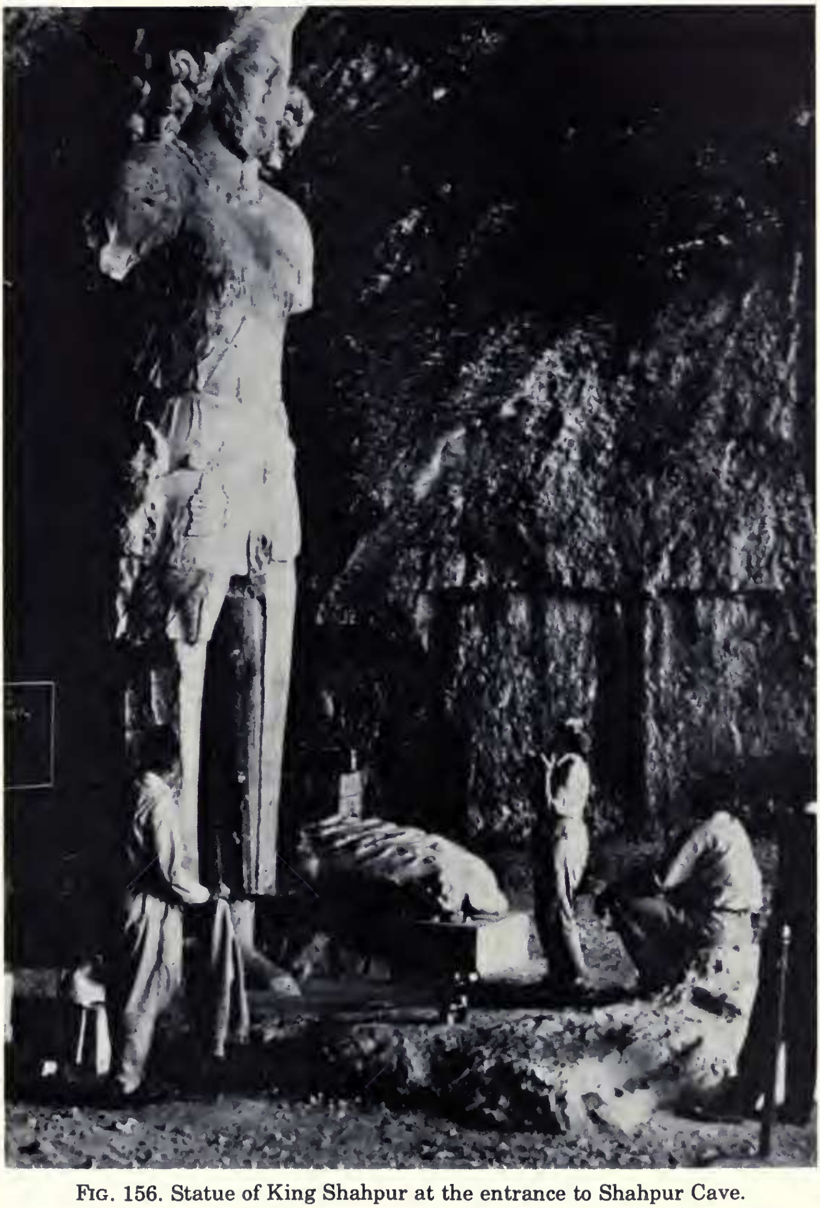

FIG. 156. Statue of King Shahpur at the entrance to Shahpur Cave.

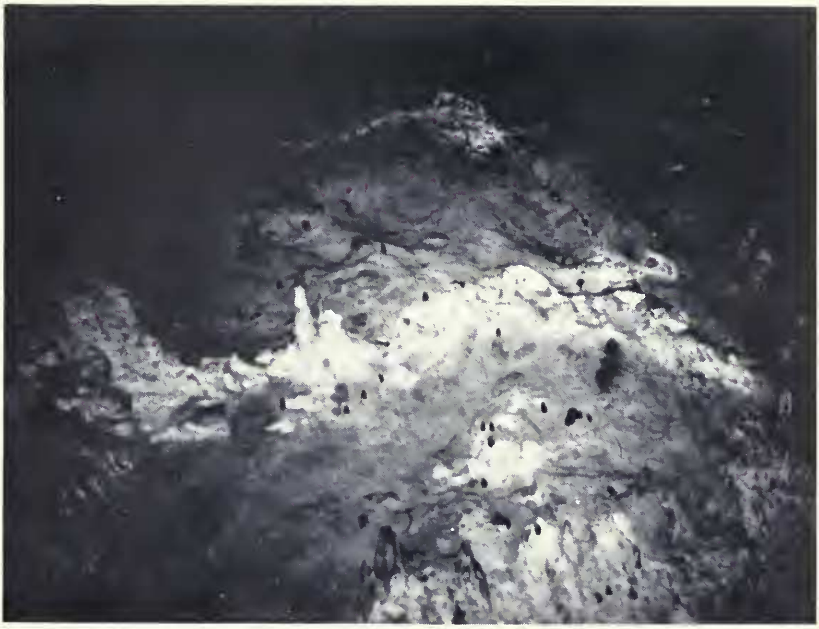

FIG. 157. Scattered *Miniopterus schreibersi* on the ceiling of area #3 (see fig. 155) in Shahpur Cave.

Nyctalus noctula from "old houses on the coast ... alt 0 ft." near Rasht on 21 May 1907 (Thomas, 1907).

Etemad (1970) reported a specimen of *Nyctalus lasiopterus* from Rud Sar that had been collected by a local high school student. This is the only record of this large bat from Iran. The Institute of Public Health Research team collected one *Myotis mystacinus*, 49 *N. noctula*, and two *Pipistrellus pipistrellus* from Siahkal on 15 and 16 June 1969.

On the early morning of 10 May 1974 Robert Tuck found a female *Pipistrellus kuhli* dead but fresh in the street in Bandar-e Pahlavi. This is not a locality from which this bat is to be expected, and it is quite likely that the specimen was carried into the area by a truck or other vehicle.

Hamadan Province (HAM)

Hamadan Province, one of Iran's smallest, is situated in the central Zagros Mountains where it is surrounded by Kordistan, Gilan, Central, Loristan, and Kermanshahan Provinces. The entire province is quite mountainous with no area below 1,500 m. and with Mt. Alvand, the highest peak, at 3,574 m. The largest city and provincial seat of government is Hamadan. Other major towns are Malayer and Nahavand in the south and Razan in the north.

The bat fauna of Hamadan Province is very poorly known with only three recorded species. Etemad (1967, 1969) reported *Rhinolophus euryale* collected in Khorzaneh Cave near Hamadan in the summer of 1966; *Plecotus austriacus* collected from a colony in Gombad Alavion, an old tomb in Hamadan, in August, 1965; and *Miniopterus schreibersi* collected from Alisard Cave, Kabutar-Ahang, in Hamadan in July, 1964.

In the late summer of 1973, T. Booth collected bats in Hamadan Province. His specimens in the British Museum include nine *M. schreibersi* collected on 2 September from groups roosting on the ceiling about 150 m. inside an "extensive wet and muddy cave at Ali Sard, near Gal Tappen"; 13 *M. schreibersi* collected on 25 August from 150 m. inside a cave near Arac Langri, near Malayer; and one *P. austriacus* found roosting singly on a rock shelf 10 m. inside a horizontal cave in the Sultanabad area near Malayer on 31 August.

Ilam Province (ILA)

Ilam Province is a strip of mountains and plain on the western flank of the Zagros along the Iraqi border. Elevations range from below 100 m. on the edge of the Khuzistan plain, up to 2,714 m. at Mt. Manisht. The town of Ilam is the province's largest community and seat of provincial government. Seven species of bats are known from six localities in Ilam Province. Lay (1967, p. 132) reported a specimen of *Rhinopoma hardwickei* (could be *R. muscatellum*) in the collections of the British Museum from Bisheh Deraz in what is now southern Ilam Province.

On 28 August we visited Porcupine Cave, about 33 km. SE Ilam. To reach it, we drove down the then-uncompleted highway to Khurramabad about 21 km. from the circle in Ilam, turned right on an unpaved road, and in a few meters turned right again onto another unpaved road. We continued on this for about 8 km., then turned left, and drove across country for about ½ km. to the base of a small valley. The cave is located about 1,200 m. further up the valley on the left side. The cave entrance and entrance passage are triangular, about 3 m. wide at the floor with the apex about 2.5 m. high (fig. 158). This triangular passage continues for several meters and then

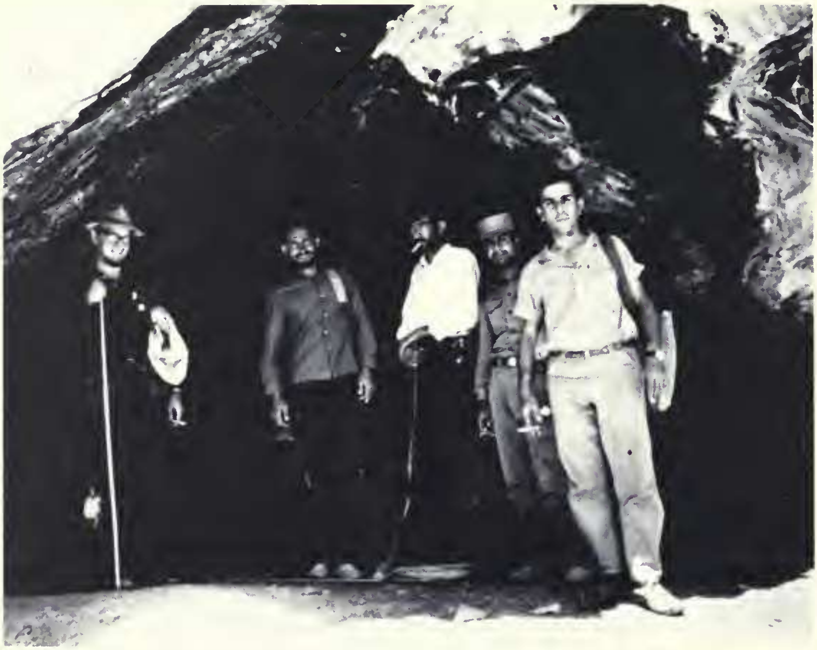

FIG. 158. Entrance to Porcupine Cave near Ilam.

opens into a larger room (fig. 159) that has limestone cave formations. One *Myotis blythi* was found in this room. Two crawlways open off the rear of this room. The one to the right slopes down a few meters to a small circular chamber where it ends. The one to the left extends for a few meters to a narrow passage that runs at right angles to the crawlway. This passage ends within a few meters of the crawlway in either direction. Twenty-eight *M. blythi* hung in this passage.

The floor of the cave was covered with quite a bit of old dried guano, and many areas had a thin layer of fresh droppings. The cave was quite warm and humid. The temperature in the passage where most bats were collected was 69°F and the relative humidity was 90 per cent.

In addition to the bats, the cave contained many porcupine, *Hystrix*, droppings and a great many loose quills. I thus christened it Porcupine Cave.

On the evening of 31 October I observed several small bats flying in a large garden and orchard in the town of Ilam. The following

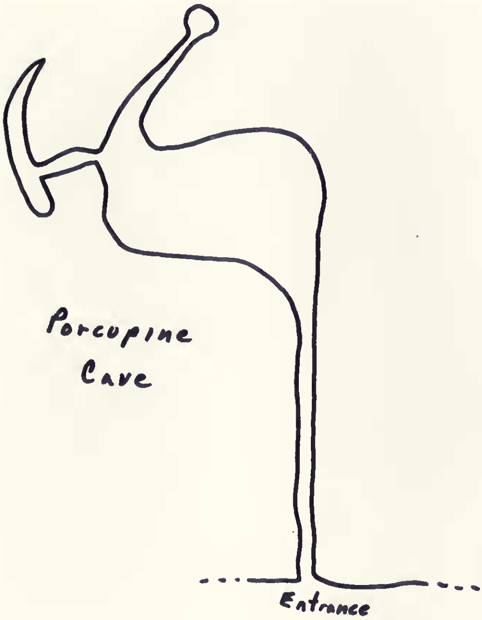

FIG. 159. Diagram of Porcupine Cave near Ilam redrawn from field notes.

evening we set a mistnet in a clearing between four very large and ancient trees in this garden. We saw numerous small bats flying but captured only a single *Pipistrellus pipistrellus* in the mistnets. The residents told us the bats roosted by day in hollows in the old trees. A check of all accessible holes in these trees yielded no indication of bat habitation.

On the evening of 1 September 1968 several members of our party shot four *R. muscatellum* at dusk along the river about 64 km. S of Ilam on the road to Mehran. On 4 September, at a point about 64 km. S of Ilam on this same road, we found a small slit-like cave (fig. 160) penetrating a clay hill a few meters to the left (east) of the road. The tall, narrow cave opened on both ends and reached only a dim twilight in the center. About 50 *Rhinopoma* hung high on the walls of the simple passage. We threw chunks of dried clay at them and collected 10 *R. muscatellum* in handnets as they flew about the cave. As observed elsewhere with this genus, the bats flew actively about the cave but were reluctant to leave it. No temperature or humidity measurements were taken, but the cave seemed quite hot and dry.

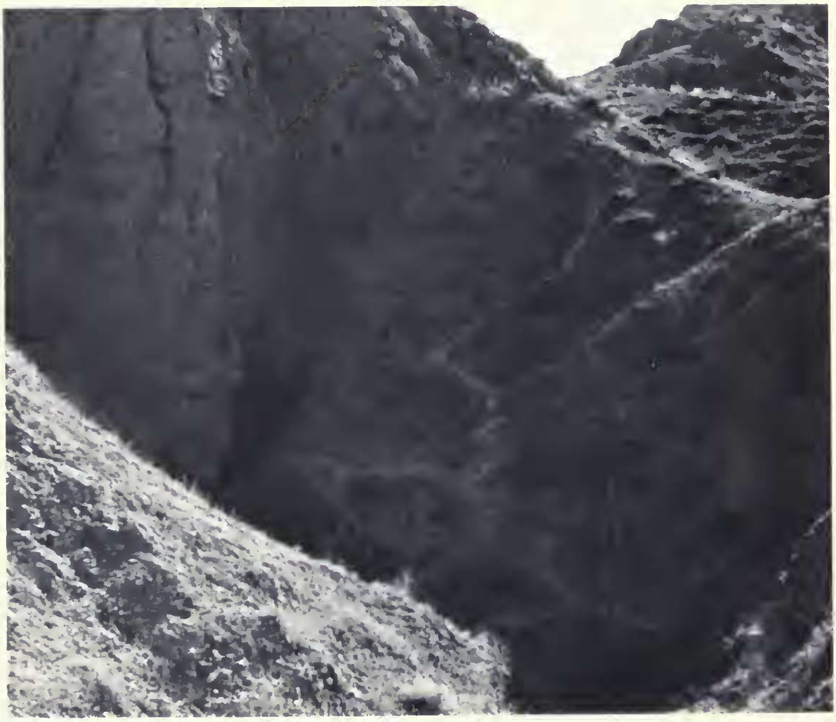

FIG. 160. Entrance to small cave about 64 km. S Ilam where *Rhinopoma muscatellum* were collected.

The temperature at Mehran, 17 km. to the south, on this date was over 100°F.

On 4 September we stopped for lunch in Mehran, on the Khuzistan plain near the Iraqi border. A boy brought us a mummified *Asellia tridens* that he said had come from his home in the town. He said the bats had been abundant in the building but now were gone. We were unable to determine if this meant they had migrated, had been exterminated, or had left for another reason.

On the evening of 4 September we visited Sarin Ab-Garma (meaning "beginning of the hot water") Cave located in the mountains just northwest of Dehloran. The cave is near the source of a warm, sulphurous stream. The cave has a huge entrance that we reached at dusk. At our arrival hundreds of bats were observed flying around the entrance. Figure 161 is a very diagrammatic sketch of this cave drawn in 1975 from memory and written field

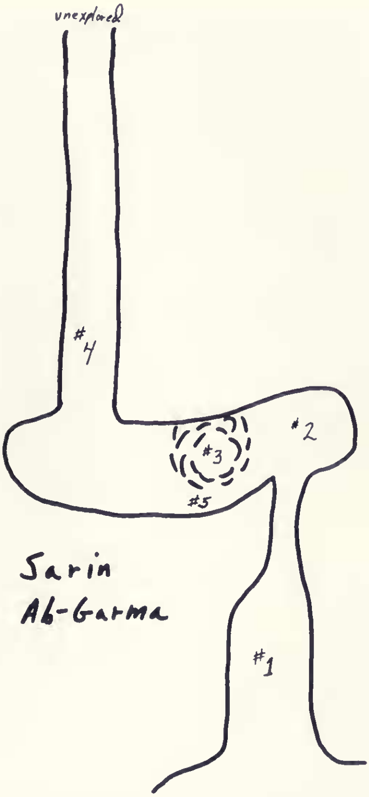

FIG. 161. Crude diagram of Sarin Ab-Garma Cave near Dehloran. Drawn from memory and a written description in the field notes. For an explanation of the numbers see the text.

notes. Reference numbers in the description below refer to numbers on this sketch. The broad entrance passage (#1) slopes steeply upward and then opens into a relatively large room (#2). This room has some piles of breakdown, and much of the ceiling is covered with small, sculptured domes about a meter or so in diameter. Left of the entrance passage, beyond a pile of breakdown (#3), a huge corridor (#4) opens off the back of the room. This corridor is about 5 m. wide and the walls converge gradually to meet about 35 m. above the floor.

At the time of our visit hundreds of bats were flying outside the entrance to the cave and all through the cave passages. In area #2 we observed about 100 *R. microphyllum* hanging from the sides of the numerous small domes. Two of these were collected with a handnet and two others that were beyond our reach were shot with a .22 pistol loaded with rat shot.

In the corridor (#4) I observed several thousand *A. tridens* and a single *M. schreibersi*. Each of these bats occupied a spot of crystallized urine about 15 cm. in diameter. These urine spots were scattered about 15 cm. apart over the entire walls of this corridor, beginning about 2.5 m. above the floor and continuing almost to the line of convergence.

Our drive from Mehran to Dehloran had been extremely hot and dry; frequently dust had been so thick it was necessary to use the windshield wipers to maintain visibility. By the time we reached the cave, our entire party was thoroughly physically exhausted. The cave was quite hot. The temperature in the corridor (#4) was 85°F and the relative humidity was 80 per cent. The temperature and humidity in the large room at point #5 was 87°F and 49 per cent. Point #5 seemed cooler than the rest of the cave even though it was 2°F warmer than the other area measured because of the lower humidity and because at this point there was a slight but detectable air current. No air movement could be detected with cigarette smoke in the deeper areas of the cave. Whereas our exhaustion from the day's trip may have been a contributing factor, we all felt that the cave had a definite oxygen deficiency. We were unable to move about actively for more than a few minutes, then we had to sit down to rest and catch our breath before beginning again. Because of these circumstances the cave was only superficially explored and only a few bats were collected.

At point #5 in the large room we used a handnet to collect bats that were flying. In this manner we collected 14 *M. schreibersi* and seven *A. tridens*. I do not know why *Miniopterus* dominated the sample of flying bats, but I observed only one among the many thousands of roosting *Asellia.*Perhaps they inhabited a portion of the cave we failed to explore or perhaps they had all begun to fly before we arrived.

In October, 1970, at my suggestion, Dr. Douglas Lay and a student visited this cave. At that time they estimated the population to include about 5,000 *Asellia* and 100 *Rhinopoma*. They saw no *Miniopterus* (Lay, pers. comm., 1973).

Sarin Ab-Garma Cave is an extremely interesting locality in several ways. It houses a very large bat population of at least three species, it has complex and unusual environmental conditions, and the presence of the urine spots and the bats' behavior with respect to them is unique. I regret that we were unable to study this cave more closely and I hope that in the near future someone will make it the site of a detailed and comprehensive ecological investigation.

Kahkilureh and Boyre Ahmad Chief Governate (KBA)

This Chief Governate is a small, roughly triangular area on the southwestern flank of the Zagros Mountains. It is bordered to the west by Khuzistan Province, to the northeast by Chahar Mahal and Bakhtiari and Esfahan Provinces and to the southeast by Fars Province. It contains no major towns.

The only bat specimen known from Kahkilureh and Boyre Ahmad Chief Governate is an *Eptesicus bottae* that was shot by H. E. Witherby near Basht, 4,000 ft. altitude, on 10 June 1902.

Kerman Province (KRM)

Kerman is a large and ecologically varied province in south-central Iran. The western portion of the province contains the southeastern end of the Zagros Mountains, where broad plains separate mountain ridges with peaks as high as 4,422 m. Northeastern Kerman Province includes most of the barren desert, the Dasht-e-Lut, and the southeastern portion of the province encloses the western ends of the Mekran range and Hamun basin of Baluchistan.

The city of Kerman is the province's capital and largest city. Other major communities include Rafsanjan and Zarand, northwest of Kerman; Sa'idabad and Baft, southwest of Kerman; and Bam, southeast of Kerman.

Kerman Province straddles the zoogeographically important area between the Zagros and Baluchistan, but unfortunately its bat fauna is very poorly known. Only five species have been reported.

Blanford (1876) shot two *Pipistrellus kuhli* at Kerman in the early 1870's. Satunin (1903, p. 31) reported four *P. kuhli* collected at Kerman in 1901. Two immature *P. kuhli*, collected by W. Richtarleg at Ambar-Abad, Jiroft, on 5 May 1956, are in the SMNS collections. Lay (1967, p. 139) reported three *Asellia tridens* from Kerman in the collections of the Natural History Museum in Vienna.

On 8 December 1962 Lay (1967, pp. 86-87) visited a small cave about 60 m. up the south face of a rock extension 1.5 km. E Kerman.

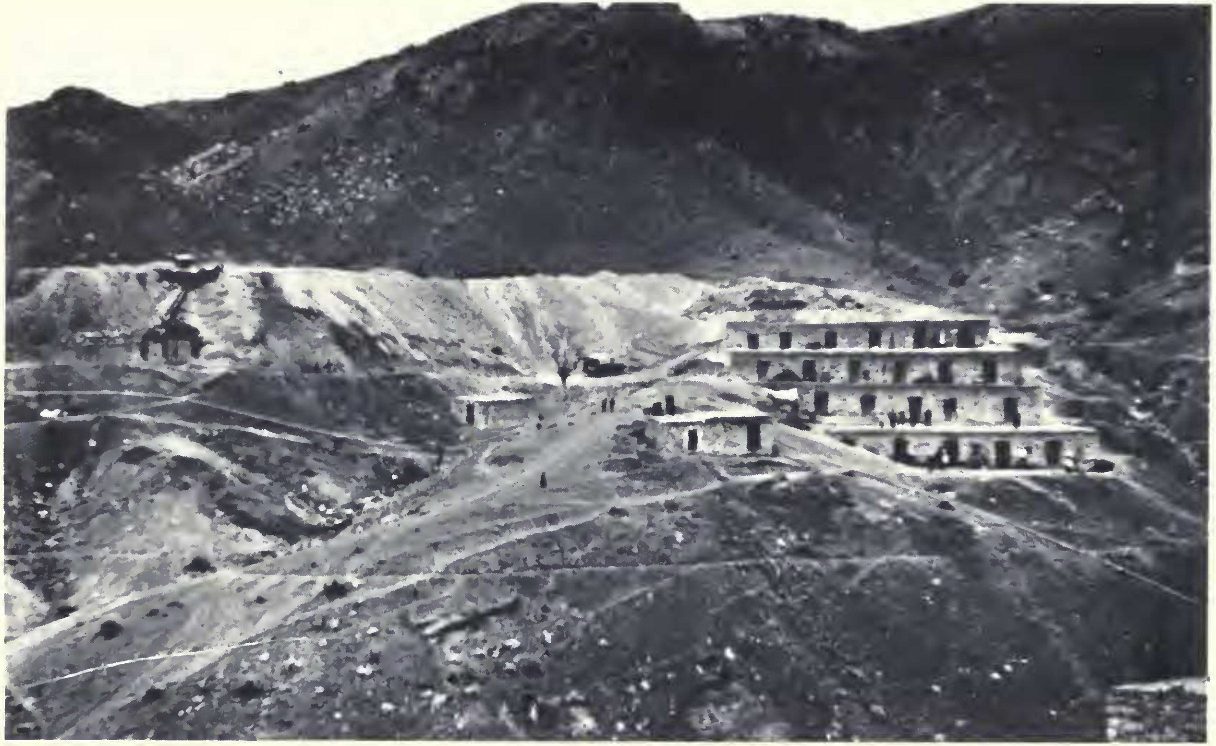

FIG. 162. Mines and village east of Sa'idabad, enroute to cave. This photo is presented as a landmark for the use of someone trying to relocate this cave.

The cave opening "divided into two shallow chambers. The southeast chamber led down to a fissure that varied in width between 0.6 and 2 m." and penetrated to a depth of at least 70 m. He found seven *Rhinolophus blasii* hibernating at a depth of approximately 15 to 20 m. in this crevice.

On 6 December 1968 I visited a large and complex cave located about 50 km. E Sa'idabad. To reach it we drove 3.2 km. S of Sa'idabad on the highway, and then turned east on a major gravel road. We continued on this road for 37.0 km., then turned left on a dirt road, and drove 33.8 km. up into the mountains through a mining village and past the mines (fig. 162). We parked at 2,440 m. elevation and walked about 2 km. further and about 60 m. higher to the cave near the top of a small mountain.

From the entrance the cave sloped sharply downward as a very wide slit with a flat floor and ceiling. It is apparently a fault crack and not a solution cave. While still in the twilight zone, we saw a large, slow-flying bat but failed to capture it. About 30 m. down the slope from the entrance, we found a single female *Rhinolophus ferrumequinum* hanging from the wall, deep in torpor. The slope continued for about 30 m. more, and then the chamber split into many small passages. Most of these extended only about 15 m. before ending. One to the left extended for about 45 m. and ended at the top of a vertical slit through which a passage could be seen over 30 m. below. Since we had no ropes with us, we did not proceed further.

Most of the cave floor was carpeted with a thin layer of bat guano, indicating that this cave houses a sizable bat colony during the summer months. In some areas the pellets were quite small and in other areas the pellets were noticeably larger, indicating that the cave is inhabited by at least two species. Only the one *R. ferrumequinum* and the one unidentified bat, which was probably also *R. ferrumequinum*, were seen during our visit.

Felten (in press) reported a male *Pipistrellus pipistrellus* collected at Rafsanjan in 1972 and a female *P. kuhli* from the same city collected on 21 April 1974.

Kermanshahan Province (KRS)

Kermanshahan Province occupies a portion of the central Zagros along the Iraqi border. Elevations range from 500 m. to 3,395 m. Through much of Kermanshahan Province the mountain ridges are widely separated by broad, agriculturally productive river valleys.

Kermanshah is the largest city and provincial capital. Other cities and large towns are numerous, including Ravansar, Kangavar, Shahabad, and Karand.

Eight species of bats are now known from Kermanshahan Province. But prior to the 1968 Street Expedition only a single bat specimen was reported from the province. That, a male *Pipistrellus kuhli*, virtually volunteered to be collected by flying into an open window of a room being used as a specimen preparation area by the first Street Expedition at Faraman Village shortly after nightfall on 23 January 1963.

Between 19 and 24 August the 1968 Street Expedition camped next to a stream and poplar grove 6.4 km. north of Kermanshah. Each evening at dusk we observed hundreds of bats flying above and around our campsite. Mistnets were set at several locations across the stream and along the edge of the relatively lush riparian vegetation in an open field. These nets and some shooting yielded one *Myotis mystacinus*, four *Pipistrellus pipistrellus*, and one *P. kuhli*.

On 22 August a group of boys brought eight female and one male *P. pipistrellus* to our camp. We purchased these and asked to be shown where they had been collected. The boys took us to their village, less than 1 km. north of camp, and showed us the sign over the schoolhouse door (fig. 118), behind which they said the bats had roosted. They said about 20 more had escaped their attempts to capture. Other villagers told us that bats inhabited holes in the adobe construction all over the village. A check of several such cracks and holes yielded no further specimens. As we were preparing to leave the village, another boy brought us a *M. mystacinus* that he had captured in the same village, but he refused to show us exactly where he had collected it. On 24 August, just as we were leaving our Kermanshah camp for Ilam, this same boy brought us another *M. mystacinus*.

On the night of 20 August a group of Iran Game and Fish Department hunters assisting us in our activities were night-hunting for foxes and other carnivores. Fourteen and one-half km. NE Kermanshah a *Rhinolophus hipposideros* flew into the open front window of their jeep and was collected.

On 23 August 1968 we visited two caves near Ravansar. About 0.6 km. NW Ravansar on the road to Halabja, Iraq, we stopped beside the road and climbed to a small cave about 150 m. up the side of the small mountain just north of the road. The cave entrance was a little

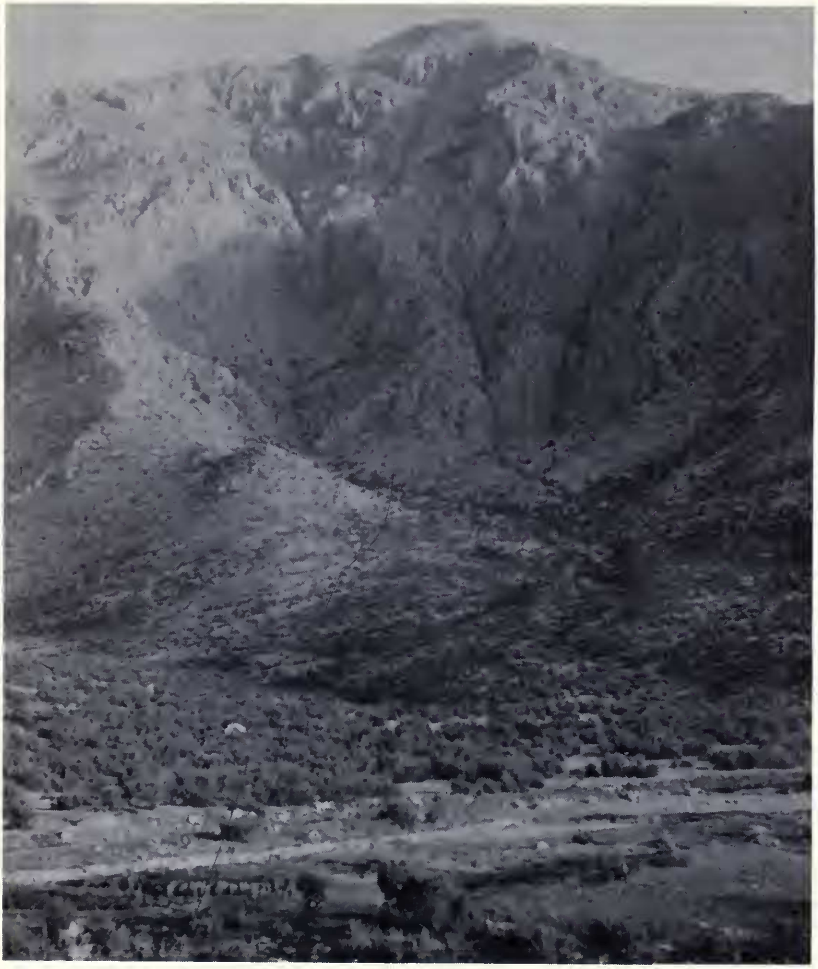

FIG. 163. Valley in which Korie Cowat Cave is located, looking southwest from the teahouse at the road about 25.5 km. NW Ravansar.

over a meter wide and about 2.5 m. tall. This opened into a tall, narrow, dry passage that extended back about 30 m. At the end of this passage a hole approximately 0.75 m. in diameter opened into a small chamber slightly more than 1 m. in all dimensions. A hole about 0.75 m. in diameter in the ceiling of this small chamber opened into another chamber directly above. The upper chamber was about 2.5 m. by 2.5 m. by 1.5 m. Both chambers contained

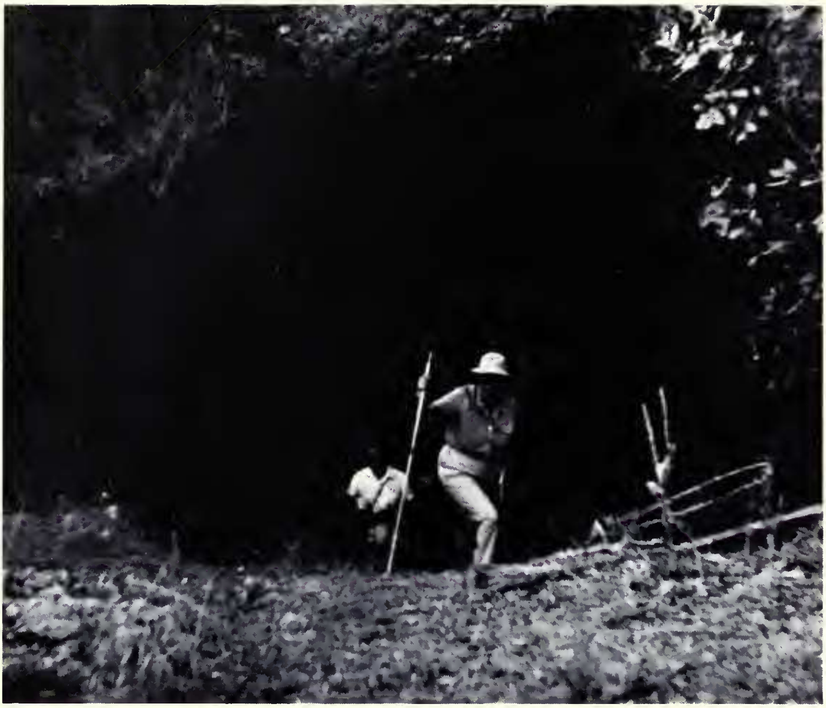

FIG. 164. Entrance to Korie Cowat Cave.

numerous miscellaneous mammal bones and had apparently been used as a den by some carnivore. The upper chamber also contained a small pile of bat guano, but no bats were found in the cave.

About 25.5 km. NW Ravansar on the same road we stopped at a teahouse on the left side of the road. Behind the teahouse we followed a path down into a deep valley (fig. 163) to the entrance of Korie Cowat. (This Kurdish name means Spring Cave. In an earlier publication [DeBlase, 1971b] I referred to this as River Cave.) From a very large semi-circular opening (fig. 164) the cave floor sloped very steeply downward to a tunnel containing a stream. The stream was flowing toward the tunnel entrance at the bottom of the slope and disappeared through an opening that was under the slope and was completely concealed beneath the water. The twilight zone ended at about the point where we reached the water. We waded upstream and observed numerous *Myotis blythi* and *Miniopterus schreibersi* hanging from the ceiling of the cave. Several meters back from the tunnel entrance the cave bent to the right at a sharp

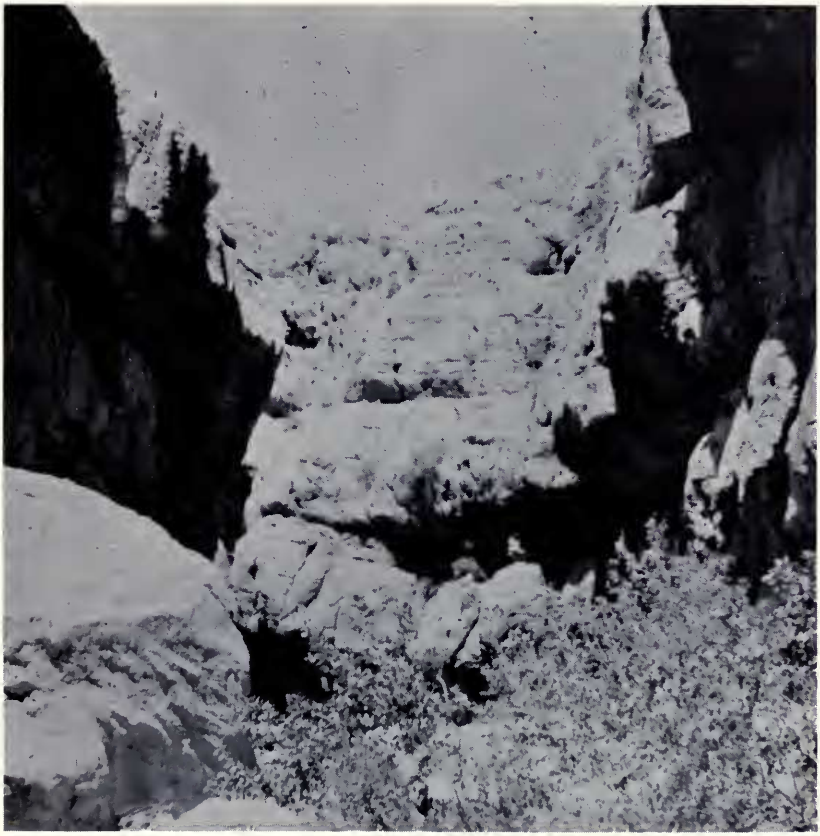

FIG. 165. Mar Ab Canyon.

angle, but at this point the stream depth was above our waists and we did not continue further. A very large cluster of *M. blythi* carpeted the ceiling above the deep water at the bend. I estimated the numbers we had observed as 7,000 *M. blythi* and 1,000 *M. schreibersi*. We collected 26 of the former species and 17 of the latter. This very interesting cave warrants further investigation by boat.

On 25 August 1968 we drove 100 km. NW Shahabad on the highway to Baghdad. We parked beside the road and descended into a deep canyon (fig. 165) on the south side of the highway. The stream flowing through the canyon is called Mar Ab, meaning "snake water." Water lines on the canyon walls indicated that the stream sometimes is as much as 2.5 m. deep, but at the time of our visit it was reduced to a series of small pools. Much of the canyon is filled with piles of gigantic boulders, some as large as a five-room house. As we approached, bats flew from spaces under these boulder piles. They were very elusive, and though I saw approximately 100 bats flying, I never saw one hanging up. We did find several small guano piles, varying from 30 to 60 cm. in diameter and 2 to 3 cm. deep, beneath roosting spots on the undersides of boulders. We used a handnet and fig branches to collect flying bats and obtained two *R. ferrumequinum* and two *Myotis emarginatus* by this method. We returned to a small pool and waterfall downstream to cool off and to allow the bats to settle down. Then, one of the Game and Fish Department hunters, skilled in stalking big game, quietly approached the rocks and with a single shot from his shotgun collected 21 *R. ferrumequinum*. The sample of this species from this site included 12 females, nine males, and two specimens too mangled for sex to be determined. The guano deposits were not large enough to indicate the presence of these bats throughout the summer and the rocks are too exposed for a hibernaculum. I assume that this locality is used as a temporary roosting site after the breeding season and before hibernation. Of the approximately 100 bats originally seen, I estimate by size and flight patterns that about 90 per cent were *R. ferrumequinum* and 10 per cent were *M. emarginatus*.

Khorasan Province (KHR)

Khorasan, Iran's largest province, occupies most of the northeastern portion of the country, extending about 900 km. from its northwest corner with Mazandaran Province and the USSR, to the southeast corner where it meets with Afghanistan and Seistan. In the north it contains the eastern ends of the Elburz Mountains and the southeastern portion of the Kopet-Dagh. Along the eastern portion of the province several small mountain ranges separate the major central basins of Iran from those of Afghanistan. The western edge of Khorasan Province includes the eastern end of the Dasht-i-Kavir and the northern half of the Dasht-i-Lut.

Mashhad, one of Iran's largest and most important cities, is located in northeastern Khorasan and is the province's seat of government. Other cities and major towns in northern Khorasan are Quchan and Bojnurd, northwest of Mashhad; Neyshabur and Sabzevar, west of Mashhad; Kashmar, Torbat-i-Heydariyeh, and Torbat-e-Jam, south of Mashhad; and Sarakhs on the Soviet frontier northeast of Mashhad. In southern Khorasan, the city of Tabas lies on the north edge of the Dasht-i-Lut and at the east end of the only road traversing the central deserts. Birjand is the main city in southeastern Khorasan.

The bat fauna of Khorasan is better known than most Iranian provinces, with 16 species currently listed from 25 localities. Kuzyakin (1950) placed a dot on his map for *Myotis emarginatus* that Lay (1967) interpreted as being from Mashhad. Etemad (1967, p. 279) collected 52 *Miniopterus schreibersi* at Moghan Cave, 30 km. N Mashhad in 1964, and Farhang-Azad (1969) collected 25 female and 21 male *M. schreibersi* from this cave in July, 1968, when he observed that the "specimens were mating." Etemad (1967) reported *Rhinolophus ferrumequinum* and *M. schreibersi* from Mozduran cave, 110 km. E Mashhad, and Felten (in press) collected two *R. ferrumequinum*, six male and one female *R. euryale*, and eight male and seven female *M. schreibersi* from Mozduran on 4 October 1974.

The Iran Public Health Research team collected one adult female, one immature male, and three immature female *R. ferrumequinum*, one male *R. euryale*, one *Myotis mystacinus*, 11 *M. blythi*, three male and five female *Pipistrellus pipistrellus*, and two male and five female *M. schreibersi* from a locality (a cave?) 71 km. SE Mashhad on 29 and 30 July 1969. The same group collected 11 *M. blythi* and 39 *M. schreibersi* from a site 20 km. W Mashhad on 22 and 23 July 1969. Etemad (1967) reported *R. ferrumequinum* from Shandiz Village, 34 km. W Mashhad.

Chelmir, north and west of Mashhad near the Soviet border, has yielded the largest series of bats in both numbers of species and numbers of individuals taken from any locality in Iran. Farhang-Azad (1969) reported mistnetting one female *R. ferrumequinum*, one female *R. bocharicus*, one male and three female *Myotis emarginatus*, two male and two female *M. blythi*, two male and five female *Pipistrellus savii*, one male *Eptesicus serotinus*, five male *E. bottae*, and two male and three female *Otonycterus hemprichi* over or along streams at Chelmir during July, 1968. In mid-July, 1969, the Iran Public Health Research team collected two female *R. blasii*, one *M. blythi*, four *E. serotinus*, 69 *P. pipistrellus*, 28 *P. savii*, 27 *O. hemprichi*, one *M. schreibersi*, and four *Tadarida teniotis* from Chelmir. In addition to all of the above, I found three male *M. schreibersi* from Chelmir in the Iran Public Health Research collections dated 28 July 1968. Farhang-Azad (1969) collected 56 male and 65 female *P. pipistrellus* from the ceiling of an old fort at Loft-abad, NW Mashhad, and mistnetted two male *P. pipistrellus* at Hessar near Loft-abad.

In northwestern Khorasan Province, Lay (1967, p. 105) found large numbers of *R. ferrumequinum, R. blasii*, and *M. schreibersi* in two qanats and a large limestone cave in early November. The wet cave, in a mountain called Ganjah Kuh, just north of Jochdi and about 5 km. S and 25 km. E Chaman Bid, consisted of "a tunnel roughly 6 m. long and 1.5 m. high and wide" that "led into a rounded room about 9 m. by 9 m., beyond which was an elongated chamber roughly 16 m. by 6 m." The qanats were located at Chaman Bid and near Shahrabad Kaur.

Further south, Satunin (1909, p. 31) reported four *P. kuhli* from Bejestan collected on 17 April 1896 and eight from Nusi collected on 13 April and 6 August 1899. Cheesman (1921, p. 575) reported one *R. ferrumequinum* collected by Watson at Torbat-e-Heydariyeh, and Farhang-Azad (1970) reported one male and one female *R. blasii* collected 5 km. NW Meher and 48 km. W Sabzevar on 5 August 1969 by the Iran Public Health Research team.

The single male *P. kuhli* collected by the Iran Public Health Research team 20 km. W Tabas (originally reported as *P. pipistrellus* by Farhang-Azad [1971]) is the only bat specimen reported from the central deserts and the only specimen known from southwestern Khorasan. In southeastern Khorasan Province, Satunin (1909, p. 31) reported one *P. kuhli* collected at Meigun on 16 May 1896 and four from Esmailabad collected on 12 June 1896. Werner (1929, p. 238) reported one *P. kuhli* collected at Tagiabad-e-Shadan.

Satunin (1909) described the *Otonycterus* form *cinereus*. Ognev (1928, pp. 446-47) said the holotype of this form was collected on 21 July 1901 in the "Zurakkuh country near the Bamrud irrigation ditch."

Farhang-Azad (1971) reported 12 *P. pipistrellus* from Sahlabad, 130 km. S Birjand, collected by the Iran Public Health Research team on 20 October 1970, but I examined two of this series and found them to be *P. kuhli*. It is likely the entire series represents this latter species. The United States National Museum team collected a female *R. blasii* 3 km. SW Esfideh on 6 November 1962 and a male of the same species 5 km. NE Esfideh on 8 November 1962.

Khuzistan Province (KHU)

Khuzistan is a large province in southwestern Iran at the head of the Persian Gulf. It is bordered by Iraq on the west and by several other Iranian provinces on the west, north, and east. In the north and northeast Khuzistan Province contains the southwestern slopes of the Zagros Mountains, but most of the province is a low, flat, arid, oil-rich plain. The Khuzistan Plain is an extension of the Mesopotamian Plain in Iraq. The Karun River runs north to south the length of the province and the Karkheh River loops through northwestern Khuzistan.

Ahvaz, Khuzistan's seat of government and Iran's oil capital, is located on the Khuzistan Plain near the center of the province. Khorramshahr, Abadan, and Bandar-e-Shahpur are ports on the Persian Gulf. Behbehan, Ramhormoz, and Masjed Soleyman flank the mountains southeast, east, and northeast of Ahvaz, respectively. Shush, the winter capital of the ancient Persian Empire, is in northern Khuzistan Province near the modern cities of Dezful and Shushtar.

The bat fauna of Khuzistan is well known in comparison to most other Iranian provinces. However, because of the fierce summer temperatures on the Khuzistan Plain (the mean maximum temperature in July at Shushtar is 47.3°C [Ganji, 1968, p. 232]), most specimens have been collected during winter months. Ten species are known from 17 localities.

At Ahvaz, R. B. Woosnam shot five male *Eptesicus nasutus*, including the holotype of *E. n. pellucens*, and five male *Pipistrellus kuhli* between 28 February and 28 March, 1905. Satunin (1909, p. 31) reported a *P. kuhli* collected at Ahvaz on 8-9 January 1904.

Bats are known from several points south of Ahvaz. Cabrera (1901, p. 118) reported a male and a female *Taphozous nudiventris* from Mohammerah (=Khorramshahr). The Iran Public Health Research Team collected two female *P. kuhli* at Darkhovin, 45 km. N Abadan on 15 September 1970 (Farhang-Azad, 1971) and three male *T. nudiventris* at the same town between 13 and 18 September 1970. The 1968 Street Expedition mistnetted a male and female *T. nidiventris* as they flew from the eves of a building in Bandar-e-Shahpur on the evening of 22 October 1968. Etemad (1973, p. 111) collected two female *E. nasutus* in a village 6 km. N Bandar-e-Mashur on 27 March 1972. Gaisler (1970, p. 7) reported a *Rhinopoma microphyllum* that had been shot by C. E. Capito as it flew around a bungalow at Mishan on "1/9/25."

The largest series of bats from southern Khuzistan Province was collected by the 1968 Street Expedition at Meshrageh, a village at the juncture of the Ahvaz-to-Behbehan highway and the Jahrihi River. Each night at dusk numerous bats flew along the river drinking and feeding on insects. Between 17 and 21 October 1968 we shot one *R. microphyllum*, nine *R. hardwickei*, two *R. muscatellum*, 10 *E. nasutus*, and one *P. kuhli* as they flew along the river. This is the only locality from which all three species of *Rhinopoma* have been documented.

At the northern edge of the Khuzistan Plain, collecting has yielded a similar species complex. Woosnam shot a female *P. kuhli* at Dezful on 11 March 1905 (Thomas, 1905, p. 520) and Lay (pers. comm., 1973) collected one of that species there on 19 June 1973. Etemad (1967, p. 277) collected one *Asellia tridens* from the large groups of this species he found in old buildings at Chogazniel (=Choga Zambil?) near Dezful in the spring of 1964. A male *R. microphyllum* in the Iran Public Health Research collection was taken near the river at Dezful in April, 1968.

Col. F. M. Bailey collected a *P. kuhli* at Shushtar on 21 January 1918 (Cheesman, 1920, p. 327). Between 9 and 13 September 1970, the Iran Public Health Research team collected 13 *R. microphyllum*, 90 *R. hardwickei* (these could be *R. muscatellum*), 38 *A. tridens*, and three *P. kuhli* from a locality 3 km. from Shushtar. Lay (1967, p. 143) reported an *A. tridens* from Shush in the collections of R. E. Mumford, Purdue University. On 24 October the 1968 Street Expedition found a colony of approximately 250 *P. kuhli* among the straw mats above the rafters in a flour mill in Shush. We collected 45 specimens including eight males and 33 females. Lay (1967, p. 143) collected a *P. kuhli* as it flew over the Karkheh River 19.3 km. S Shush on 17 January 1963, and Harrison (pers. comm., 1975) has a specimen of *E. nasutus* collected at Choga Zambil (Ziggurat) near Shush. The MMTT collection includes a very young *T. nudiventris* shot on 17 May 1969 and a barely volant *P. kuhli* shot on 15 May 1969, 26 km. E Haft Tappeh.

Collecting on the Khuzistan Plain has yielded all three species of *Rhinopoma*, as well as *T. nudiventris, A. tridens, E. nasutus,* and *P. kuhli*, but the few collections made in the mountains of Khuzistan Province have yielded other species. On 10 April 1905 R. B. Woosnam shot an *Eptesicus bottae* among the oak trees on the hillside at Mala-i-Mir (=Izeh) at an altitude of 4,300 ft. At the southeastern edge of Khuzistan Province H. F. Witherby collected a *R. microphyllum* (Cheesman, 1921, p. 575), a *Myotis blythi*, and an *E. bottae* (Thomas, 1905, pp. 520-21) at Telespid, 3,200 ft. elevation, on 13 June 1902. Etemad (1967, p. 277) has collected *Rhinolophus euryale* at Behbehan.

Kordistan Province (KOR)

Kordistan Province is located in northwestern Iran. It is surrounded by West Azarbaijan, Zanjan, Hamadan, and Kermanshahan Provinces and Iraq. There are three major towns in Kordistan Province: Sanandaj, the provincial capital, is in the south; Bijar is in the west; and Saqqez is near the northern border.

Kordistan is located entirely within the central Zagros mountain system, but the province is characterized by high rolling mountains rather than rugged peaks. Large wheat fields are common.

No bat specimens had been reported from Kordistan Province prior to the 1968 Street Expedition. We collected three species from three locations. Lay (pers. comm., 1970) collected two species at two additional localities in 1969.

On 11 August 1968 we examined several small caves and qanats in the vicinity of Bijar but failed to locate any evidence of bats. On 12 August we visited a large mosque just west of the center of downtown Sanandaj where we collected 15 of the approximately 20 *Myotis blythi* found roosting in spaces between bricks in the small domes in the ceiling of a storeroom at the northeast corner of the building (fig. 144). We also found three skeletons of *M. blythi* hanging together on the wall of a small storeroom near the northwest corner of the mosque (fig. 105).

On the evening of 13 August a man brought two crates enclosed in burlap bags into our camp just south of Divandarreh. The crates contained 129 *Rhinolophus mehelyi*, 919 *M. blythi*, and 549 *Miniopterus schreibersi*. Most of these were already dead of suffocation and most had begun to rot. We preserved 25 *R. mehelyi*, 24 *M. blythi*, and 19 *M. schreibersi*. We also decapitated approximately 300 of the remaining specimens and preserved the heads in glycerin to be used in rabies research at the Institute Pasteur de l'Iran in Tehran. The remaining carcasses were buried.

On the following day the man guided us to the cave from which he had collected these bats. We proceeded north from Divandarreh on

FIG. 166. 1968 Street Expedition members at the entrance to Gara Tarik.

the Saqqez highway for about 6 km., turned right on an unpaved road, proceeded about 5 km. to the village of Qaleh Rutaleh, continued about 8 km. to the village of Qareh Darreh, and went on about 3 km. to a village named Qaleji or something similar. About 1 km. beyond this last village and up the slope to the right of the road was the entrance to Gara Tarik (fig. 166).

The entrance to Gara Tarik (meaning "dark cave" in Persian) faces approximately north and is about 1.5 m. wide and about 6 m. high. The limestone solution cave branches repeatedly (fig. 167) and most passages were 1.5 to 2 m. high. There was no water visible in the areas we explored and no evidence of water in the recent past. Once we passed the twilight zone, we found the cave full of bats (fig. 168). Mixed clusters of *R. mehelyi, M. blythi,* and *M. schreibersi*

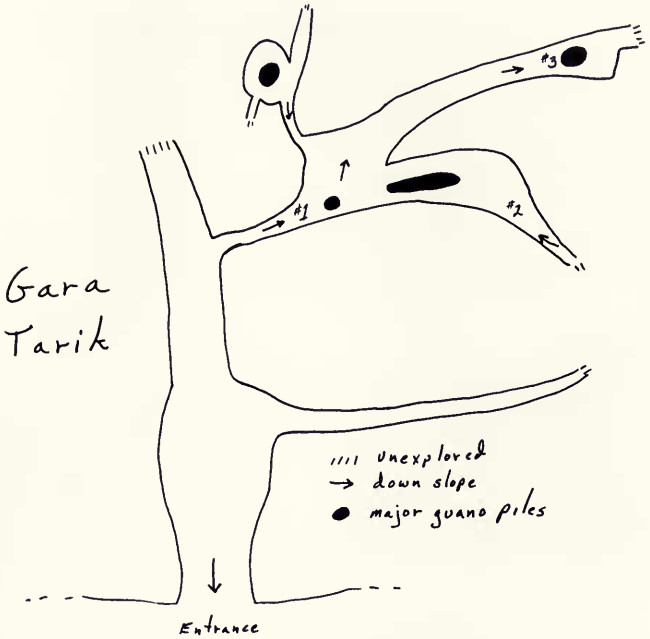

FIG. 167. Diagram of Gara Tarik redrawn from the field notes. See the text for an explanation of the numbered areas.

carpeted the numerous low domes which were from 1 to 4 m. in diameter and one-third to 1 m. high. Scattered between the domes many *M. blythi* and *M. schreibersi* hung singly or in small clusters (figs. 139, 140). The large carpets in the domes contained the three species in a ratio of 8 *M. blythi* to 2 *M. schreibersi* to 1 *R. mehelyi*. However, this is probably misleading, since the *R. mehelyi* were very alert and active and flew away from a cluster as soon as we approached. The *M. schreibersi* were also rather active but less quick to fly, while the *M. blythi* were in torpor. Two such torpid *M. blythi* took about 5 min. to awaken enough to fly away from my open, gloved hand. Very high domes and cracks in the cave ceiling were filled with scattered *R. mehelyi*. These were all active and were probably individuals who had flown from the large clusters at our first approach.

I made an approximate count of the number of individuals in an average-sized dome, about 2 m. in diameter and about .5 m. high, and estimated this cluster at about 2,000 individuals. Using this as

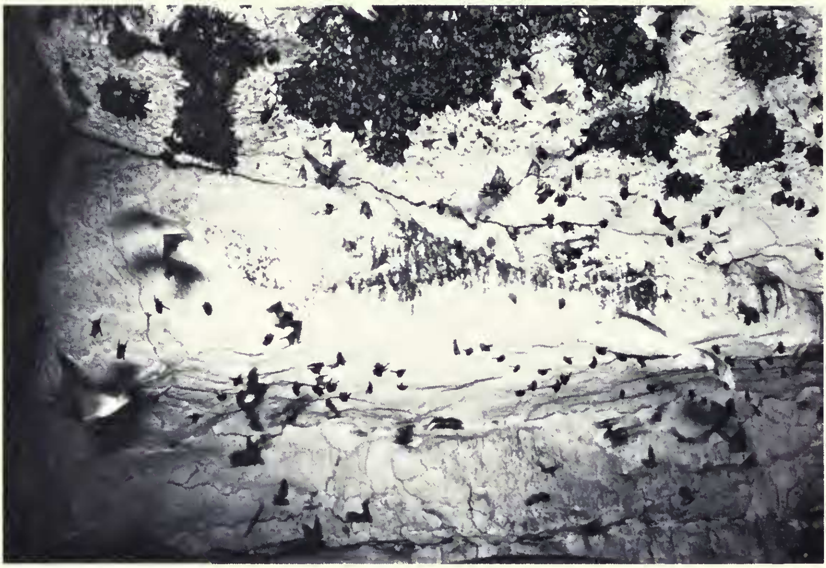

FIG. 168. The interior of Gara Tarik. Small clusters and scattered individual bats are present in foreground and background. The dome with stained sides was carpeted with bats prior to our disturbance. The top of a guano pile under this dome is barely visible as a black line at the bottom right of the photo.

a guideline I estimated the total population of the cave at about 30,000 bats. I also estimated that the cave contained about equal numbers of *R. mehelyi* and *M. blythi* and about half as many *M. schreibersi*. These estimates would give a total cave population of 12,000 *R. mehelyi*, 12,000 *M. blythi*, and 6,000 *M. schreibersi*.

The floor of the portion of the cave inhabited by bats was carpeted with a layer of guano several centimeters deep. Under the large bat clusters were mounds of guano ranging from 2 to 3.5 m. in diameter, depending upon the size of the dome, and from 1 to 1.5 m. in height. We were told that the local inhabitants sometimes removed guano from the cave to use as fertilizer, and the large pile closest to the entrance showed signs of this activity (fig. 141).

Temperature and humidity were recorded at two points in the cave, labeled A and B in Figure 167. At point A the temperature was 59°F and the relative humidity was 94 per cent. At point B the temperature was 64°F and the relative humidity was 89 per cent. I tested several places in the bat-inhabited area with cigarette smoke and could find no detectable air currents.

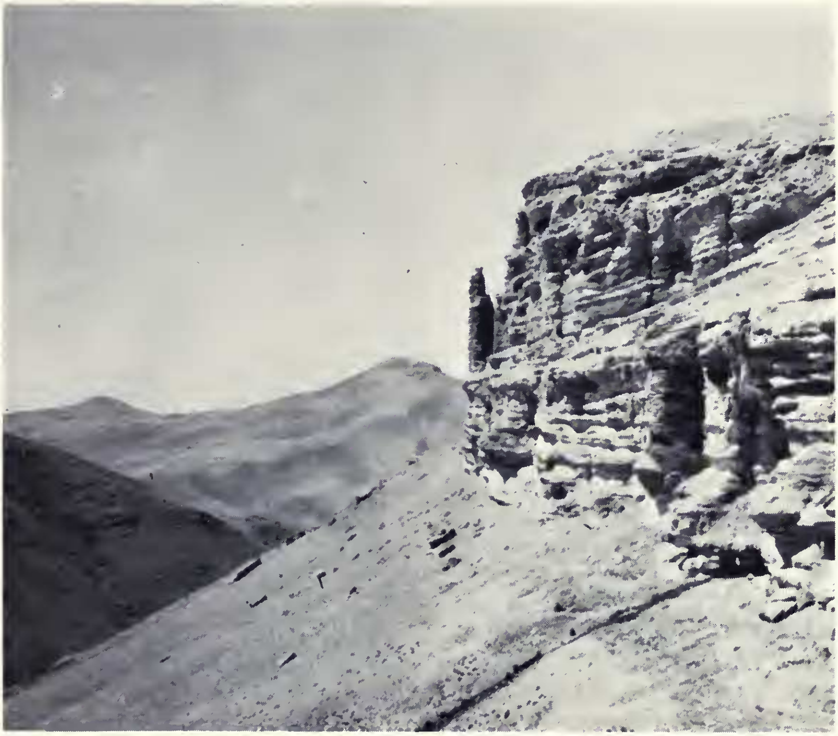

Fig. 169. Karaftu, a cave and cliff-dwelling complex, is located at the far end of the cliff in this photo. The picture was taken from beside our truck at the location described in the text.

We collected only 16 *R. mehelyi*, one *M. blythi*, and seven *M. schreibersi* at the time of our visit. Sex ratios for the total sample of 723 sexed individuals was about 2 ♂ to 3 ♀ for *R. mehelyi*, 1 ♂ to 3 ♀ for *M. blythi*, and 1 ♂ to 2 ♀ for *M. schreibersi*.

On 16 August 1968 we proceeded north from Divandarreh on the Saqqez highway about 37 km., then turned right onto a good gravel road, and continued about 30 km. before turning left onto a dirt track which we followed for 7 km. to the rim of a canyon. From there we looked across to a chalky yellow cliff (fig. 169) containing the cave and cliff-dwelling complex called Karaftu. The chalk had been carved into numerous rooms (fig. 170). We counted 14 but there were several more. These had numerous doors and windows opening to the exterior (fig. 142) and most were quite hot and light. There were ornately carved window frames and stairs leading from level to

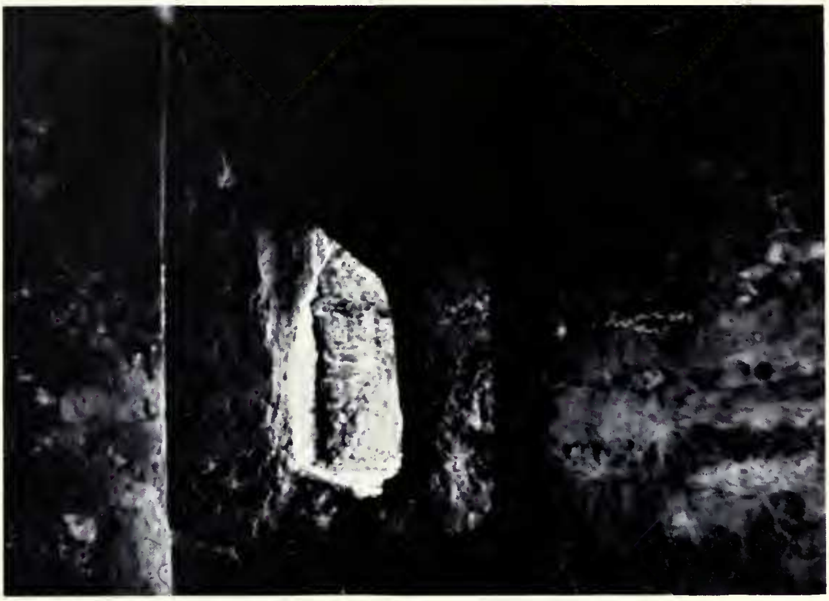

FIG. 170. Rooms and doorways in the man-made portion of Karaftu.

level. In many rooms deer, sheep, men, and trees had been carved into the walls. We were told the complex had been inhabited by the "Mod" people about 400 years before.

Near the center of the complex a very tall, relatively narrow passage appeared to be the natural portion of the inhabited area. In places in this passage beam pockets had been carved into the sides of the walls and presumably had supported a now-gone second floor. We followed this passage, taking right forks, beyond all signs of human habitation to a large, old breakdown. There we went left through a tunnel that had water standing in places. We were now in a normal limestone solution cave. We emerged into a very large room containing scattered single individuals and pairs of *M. blythi* and scattered single *M. schreibersi*. A few bats were flying but most were in torpor. To the right of our entrance the room extended about 10 m. and ended; to the left it continued for about the same distance and then branched. The right branch led down into another very large room at a much lower level. The approach was very steep and slippery so we did not descend, but several bats were observed flying and a few scattered torpid bats were seen on the ceiling of this lower room.

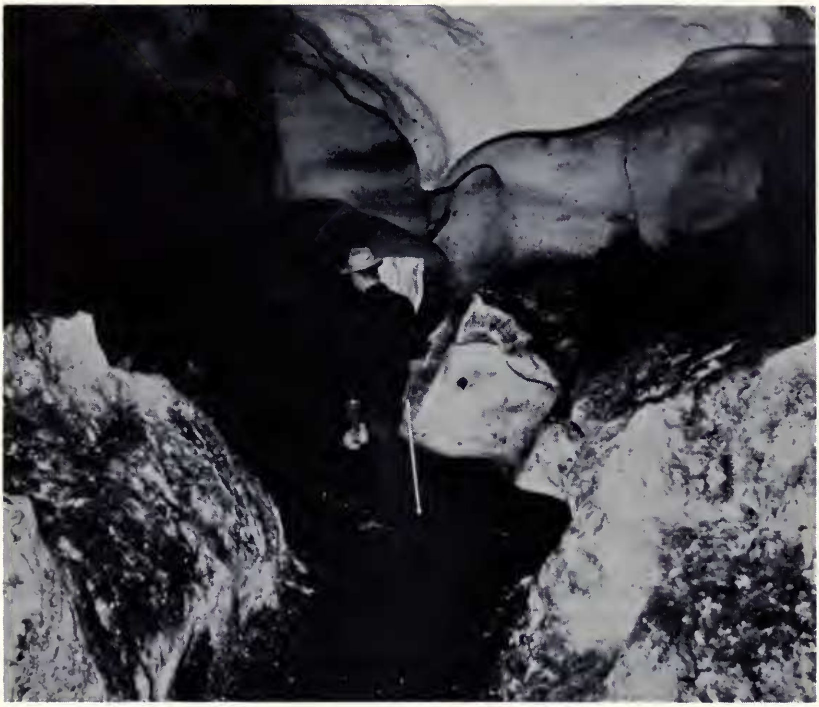

FIG. 171. A passageway in the natural portion of Karaftu.

To the left the branch went up a little and narrowed (fig. 171). Through this passage there were a few pools of water and many old formations, including flowstone curtains, pillars, stalactites, stalagmites, and rimstone pools. At the end of the passage nearest the large room were 10 or 12 scattered torpid bats. Further along the passage we saw no bats but did find several large guano piles. These ranged from 15 cm. to 2 m. in height. All, regardless of size, were situated under domes in the ceiling. The domes over the guano were always stained dark brown, while the numerous domes without guano piles were all unstained. With two exceptions the guano piles appeared to be quite old. Most were completely covered with clumps of a long-filamented white mold. Only two piles, each about a meter in size, looked relatively fresh. These were blacker, more granular, and less moldy.

The temperature in the large room was 58°F and the relative humidity was 83 per cent. Strong air currents were detected in many parts of the cave, but cigarette smoke revealed no air movements in either the large room or in the passage with the guano piles.

Apparently this cave had been a major summer roost, and probably a nursery colony, for bats in the past. But at least the portion we explored was no longer in major use. Only *M. blythi* and *M. schreibersi* were found in the cave and these occurred in about equal numbers. I estimated the total population of the areas we visited to be from 50 to 60 individuals. We collected seven *M. blythi* and eight *M. schreibersi*.

On 20 September 1969 Lay collected three *M. blythi* from a cave 36 km. NE Bijar and two *Rhinolophus euryale* from a "religious shrine" 30 km. NE Bijar.

Loristan Province (LOR)

Loristan Province is located in the central Zagros Mountains in western Iran. It is bordered by Ilam, Kermanshahan, Hamadan, Central, Esfahan, and Khuzistan provinces. Khurramabad, the province's major city is centrally located, and the city of Borujerd is near the northern border. The province has several high peaks, including Oshtoran Kuh at 4,072 m. Several of Iran's major rivers originate or flow through southern Loristan into Khuzistan Province. These include the Karkheh, Kashkan, and Dez.

Prior to the 1968 Street Expedition no bats had been reported from Loristan Province. We collected a total of five species from three localities in the vicinity of Khurramabad, and the Iran Public Health Research team collected a sixth species near Malavy.

The 1968 Street Expedition camped in a poplar grove along the Ab-i-khurramabad River about 1.6 km. S Khurramabad. Several bats were seen flying among the poplar trees and over the river each evening. We set several mistnets in these areas but took only two bats, one *Pipistrellus khuli* and one *P. pipistrellus*, from the nets. Both of these were taken on 9 September. On 10 September one of our party shot another *P. kuhli* that was flying along the river.

On 7 September we visited a cave called Eshkaf Dareze that was located high on the cliff that rises up immediately west of the city of Khurramabad. The cave is relatively small (fig. 172). The large entrance room opened into another room that continued to the right and up a ledge to the left. There were a few cave formations and

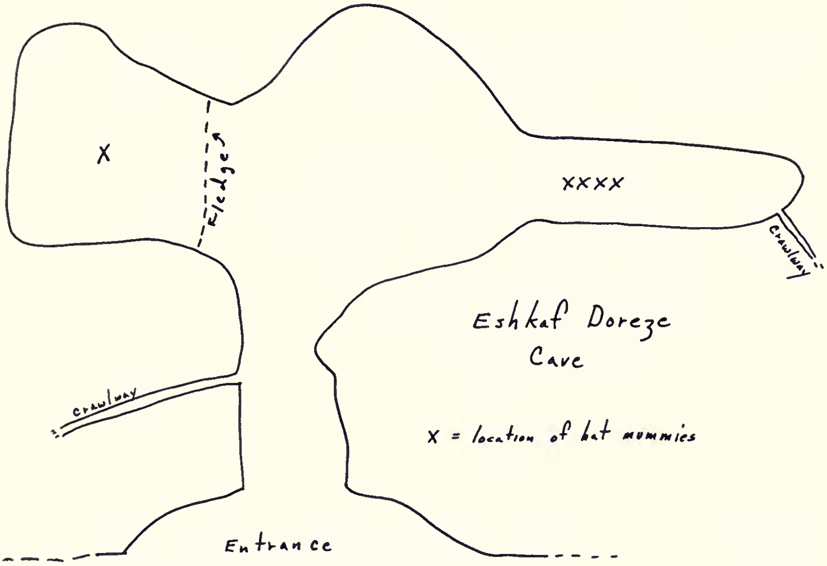

FIG. 172. Diagram of Eshkaf Dareze Cave at Khurramabad redrawn from the field notes.

some dripping water in the central area of this inner room. A thin layer of bat guano covered all surfaces to the left and right of the central area. Only one live bat was seen; this was flying near the end of the left passage. By size and flight characteristics I judged it to be a *Rhinolophus ferrumequinum*, but we failed to capture it and this identification cannot be confirmed. In this left-hand chamber we also found a single, mummified, prevolant *M. blythi* among the guano on the floor. In the right hand chamber we found three mummies of prevolant *R. euryale* among the guano on the floor. The cave was apparently a nursery site for *M. blythi* and *R. euryale* during the summer but is not a major roost in the fall or winter.

On 7 September some Department of Game and Fish representatives visited a cave 3.2 km. N Khurramabad in the north side of the same mountain containing the cave described above. They brought back five *M. blythi* from this cave. On 13 September I visited this cave. The cave consisted of two passages opening side by side to the exterior. The right-hand chamber was small and long. It contained about 50 *M. blythi* hanging from the ceiling. All of these that were captured were males. I went through a crawlway at the back of this passage and found about 12 *R. ferrumequinum* in a small, low chamber. Three of these were collected and the others flew through small openings in the rear of the chamber through which daylight could be seen. The lefthand passage opened into a small but very high chamber that did not penetrate beyond the twilight zone. Two very large clusters of *M. blythi* hung in the darkest domes of the high ceiling. Scattered individual *M. blythi* hung at regularly spaced intervals around these clusters and down the walls. We could not reach the clusters. All of the individual bats collected were males. I estimate the population in this room at several hundred.

Between 5 and 8 September 1970 the Iran Public Health Research team collected two bats at a site 10 km. N Malavy which Farhang-Azad (1971) identified as *Rhinopoma hardwickei*. I have not seen these specimens and it is possible they are *R. muscatellum*.

Mazandaran Province (MAZ)

Mazandaran is a long, narrow strip arcing along the south shore of the Caspian Sea in northern Iran. It is bordered by Gilan, Central, Semnan, and Khorasan provinces and by the Turkmen SSR of the USSR. In its narrow width, Mazandaran sweeps from Iran's highest point, the peak of Mt. Demavend, 5,604 m. to below sea level at the Caspian coast. Habitats range from the deciduous forests of the Elburz Mountains' northern slope and the fertile Caspian coastal plain to the arid Turkmen steppe of northeastern Mazandaran Province. Major cities and towns on the coastal plain from west to east are Ramsar, Shahsavar, Now Shahr, Amol, Babol, Shahi, Sari, Behshahr, and Bandar-e Shah. East of the Caspian are the inland cities of Gorgan and Gonbad-e Kavus.

The bat fauna of Mazandaran Province is one of the best known in Iran. Sixteen species have been reported from 27 localities scattered through the province.

Several early British expeditions collected in Mazandaran Province. The British Museum collections include one *Pipistrellus kuhli*, two *Eptesicus serotinus*, and one *Tadarida teniotis* that are labeled "Foot of Elburz S. E. Caspian. (E. G. Mason) Maj. G. E. H. Barrett-Hamilton." One of the *E. serotinus* skulls is also labeled "N. side S. Demavend." None of the tags bear dates, but the catalog numbers indicate that they were cataloged in 1912. R. B. Woosnam collected in the area in 1907. His specimens in the British Museum include the holotype of *Miniopterus schreibersi pallidus* dated 25 March 1907 and labeled "South Coast Caspian Sea 0'." Lay (1967, p. 147) restricted this locality to the vicinity of Bandar-e Gaz. A Woosnam specimen of *P. pipistrellus* collected on 28 March 1907 is labeled "South Coast, Caspian Sea. Alt 150 ft.," "plentiful in the forests at foot of hills."

Between 4 and 7 July (year?) Heinroth collected one *R. hipposideros*, three *Myotis emarginatus*, and nine *P. pipistrellus* from the "House of the Imperial Bank of Persia" at Barfurush (=Babol). Satunin (1909, p. 31) reported *Myotis mystacinus* from Astrabad (=Gorgan), and Bianki (1917) reported *M. mystacinus* from Ashurade (=Ashuradeh-ye-Bozorg) and *Nyctalus noctula* from Ashraf (=Behshahr) S Astrabad Bay. Kuzyakin (1950, p. 246) mapped four localities for *M. blythi* in Mazandaran Province but did not enumerate the localities. Coon (1952, p. 244) reported finding a jaw of *Myotis myotis (=M. blythi)* during his excavations at Hotu Cave near Behshahr.

Etemad (1967) reported collecting *R. hipposideros* at Asporis Village near Sari and *M. emarginatus* and *P. pipistrellus* at Babol. He also reported a *N. noctula* from "South Caspian" and later (Etemad, 1969, p. E19) restricted this to Shahsavar.

Lay (1967) reported numerous specimens collected by the 1962 Street Expedition. At Sama, in the forests on the northern slope of the Elburz Mountains between 14 and 29 August Lay (1967, p. 100) mistnetted one *M. mystacinus* and one *E. serotinus* in a small clearing in the forest and one *E. nilssoni*, two *P. pipistrellus*, and three *N. leisleri* (Neuhauser and DeBlase, 1974, p. 88) over a pool in a stream. Between 4 and 6 September Lay (1967, p. 56) collected 17 *R. hipposideros* from several old barns 12 km. W and 2 km. S Chalus. On 28 October Lay (1967, p. 76) collected 12 *E. serotinus* mummies from the attic of a building in Pahlavi Dezh, a village on the banks of the Gorgan River about 19 km. N Gorgan, and on 31 October he collected nine *P. pipistrellus* mummies from similar locations 4.8 km. W Pahlavi Dezh. On 29 October Lay (1967, pp. 76, 142) shot several *P. pipistrellus*, one *M. mystacinus*, and one *M. schreibersi* as they flew over a pool in the Qareh Su drainage on the plains 9 km. N Gorgan. Only three *P. pipistrellus* were preserved as the "shooting by spotlight produced a number of individuals the majority of which proved unfit for preparation." On 3 November Lay (1967, p. 146) collected one *Vespertilio murinus* found torpid in the attic of a house at Dasht. Lay (1967, p. 142) also reported four *P. pipistrellus* collected on 27 June 1952 at Gombad-i-Kabous (=Gonbad-i-Kavus).

The Iran Public Health Research Team (Farhang-Azad, 1970) collected one *M. mystacinus* from Khoshamian Forest, 15 km. E Chalus, on 12 June 1969. The Smithsonian Institution expedition collected 25 *R. hipposideros* on 20 and 21 June 1963 from Tamishan, 20 km. W Mahmudabad. They also collected one *P. pipistrellus* from 3 km. SW Dasht on 17 May 1963 and two of the same species from 28 km. W Gorgan on 12 and 14 June. Both of these latter specimens are prevolant.

In late June 1969 Lay and Iran Department of Game and Fish personnel mistnetted bats in Mohammad Reza Shah National Park. They collected one *Myotis bechsteini*, two *E. serotinus*, two *N. leisleri*, and one *Barbastella leucomelas*.

The London University Iran Expedition led by R. H. Allen collected bats in Mazandaran Province in August and September, 1970. They mistnetted one *M. blythi* over scrub on sand dunes in Sisangon Forest Park, 37 km. E Chalus on 6 August 1970. On 14 August they mistnetted a *R. euryale* in scrub forest at Mohammed Reza Shah National Park. Between 28 August and 7 September they collected many bats at Tir Tash, including nine *R. ferrumequinum*, 19 *M. emarginatus*, and 58 *P. pipistrellus*. Most of these were taken from roosts in the loft of the Tobacco Institute or from the adjacent gardens.

Persian Gulf and Sea of Oman Coastal Province (COS)

Persian Gulf and Sea of Oman Coastal Province is a long arc, bounded inland by Bushehr, Fars, Kerman, and Seistan and Baluchistan Provinces. To the south Coastal Province borders on the southern end of the Persian Gulf, the Strait of Hormuz, and the Sea of Oman. Included in the province are numerous islands in the first two of these water bodies. Bandar Abbas on the Strait of Hormuz is the principal city in the province. Other large towns are Bastak, inland from the Persian Gulf; Bandar-e Lengeh, on the Persian Gulf coast; Qeshm, on the island of the same name; and Jask, on the Sea of Oman coast. The entire province is arid and hot year around. Agriculture is limited to irrigated oases, and much of the low but rugged land is barren.

Eleven species of bats have been reported from eight localities in the province. With three exceptions these were the work of the 1968 Street Expedition.

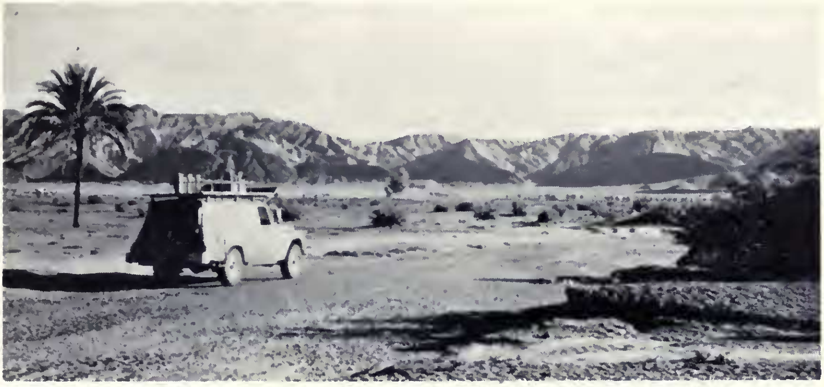

FIG. 173. Countryside NW of Bastak. *Pipistrellus kuhli* were shot flying over the flat land and *Rhinopoma* were taken from a cave in the mountains in the distance.

Blanford (1876, p. 18) found *Rousettus aegyptiacus* "abundant in caves excavated in rock salt at a spot called Namakdun, on the south coast of the island of Kishm" (=Qeshm). Andersen (1905) described *Rhinolophus h. midas* from a specimen collected at Jask. Etemad (1967, p. 277) reported collecting *Asellia tridens* at Roudan (=Rudan), 80 km. E Bandar Abbas.

From 17 to 20 November the 1968 Street Expedition camped in a garden northwest of Bastak (fig. 173). During this time we shot two of the many *Pipistrellus kuhli* seen flying in the garden at dusk. In the town I visited an old mosque that was said to have many bats hanging in a dark, lower floor room. The mosque had received a liberal application of DDT two weeks before and the room contained only dead cockroaches. On 20 November we visited a cave about 10 km. WNW Bastak near the west end of the mountain immediately north of town. The cave was small and hot; it did not penetrate into the mountain deeply enough to lose twilight. Approximately 20 to 25 *Rhinopoma* hung just inside the cave entrance. We collected 17 *R. muscatellum* and one *R. microphyllum* from this cave. Large guano piles indicated the use of the cave by larger numbers of bats during the breeding season.

From 21 to 25 November the 1968 Street Expedition camped at the southwest edge of the village of Chah Moslem (fig. 174) on the narrow coastal strip just north of Bandar-e Lengeh. Numerous bats could be seen and heard flying over the barren fields around camp each evening. Shooting yielded one *Taphozous perforatus*, seven *Pipistrellus kuhli* and two *Tadarida aegyptiaca*. On 25 November we

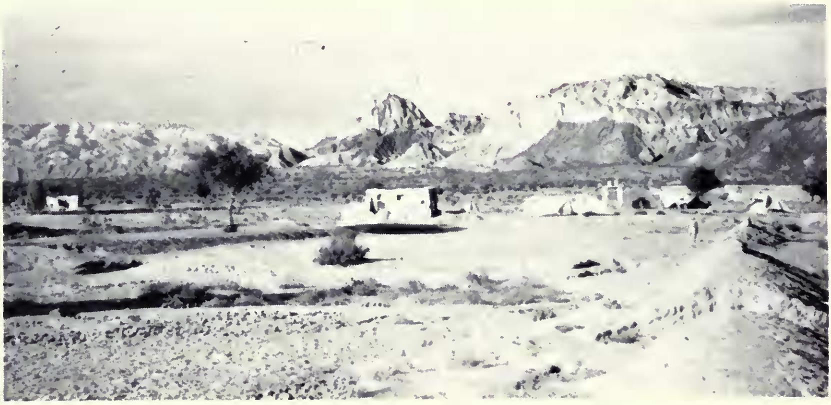

FIG. 174. The 1968 Street Expedition camp at Chah Moslem. *Taphozous perforatus*, *Pipistrellus kuhli*, and *Tadarida aegyptiaca* were shot at this campsite.

visited a cave in the escarpment about 10 km. NE Chah Moslem. This was a shallow but high cave with many entrances. Several *Rhinopoma* hung just inside the entrance. We collected one *R. hardwickei* and nine *R. muscatellum.*

On 29 and 30 November we shot bats over the Dozdan River at the northwest edge of Minab. We collected one each of *Taphozous perforatus, Eptesicus nasutus,* and *Tadarida teniotis.*

Semnan Province (SEM)

Semnan is a large province in north-central Iran. It is bordered by Central, Mazandaran, Khorasan, and Esfahan Provinces. Semnan extends from the crest of the Elburz south through most of the Dasht-i Kavir. Most of the province is essentially uninhabited desert. The major towns of Semnan, Damghan, Shahrud, and Mayamey are all located in the north at the foot of the Elburz.

Only one bat specimen has been collected in Semnan Province: a *Barbastella leucomelas* found by the 1962 Street Expedition on 16 October. The bat was roosting alone on the wall of an abandoned mine shaft that opened about 1,000 ft. up the side of a steep mountain ridge located about 2 km. NE Sang-e-Sar (Lay, 1967, p. 147).

Seistan and Baluchistan Province (SAB)

Seistan and Baluchistan Province occupies the southeast corner of Iran. It is bordered on the east by Afghanistan and Pakistan and on the south by the Sea of Oman. It adjoins the provinces of Khorasan, Kerman, and Coastal. The Seistan Basin is located in the northeastern corner of the province where the saline Lake Seistan straddles the border with Afghanistan. Most of the Seistan Basin, including its large Helmund River and the Dasht-i Margo, or Desert of Death, are situated in Afghanistan. Much of the northwestern portion of Seistan and Baluchistan Province is occupied by the southeastern portion of the Dasht-e Lut, a barren, sandy desert. The central portion of the province includes much of the eastern end of the ancient Baluchistan desert, a rugged, arid area extending through southeastern Iran and western Pakistan.

Zabol is the major town in the Seistan Basin. The city of Zahedan is situated on the ancient caravan route and modern highway to India in the northeastern portion of the province near the junction of the three nations; Iran, Afghanistan, and Pakistan. Khash, Saravan, and Iranshahr are the major towns in the central region of the province and Chah Bahar is the major town on the Sea of Oman coast.

Nine species of bats have been collected from 15 localities in Seistan and Baluchistan Province. Thomas (1913) described *Rhinopoma muscatellum seianum* from the holotype collected in Seistan by the Seistan Boundary Commission. It is possible this was collected on the Afghanistan side of the border. A single specimen of *Asellia tridens* in the British Museum is also labeled only as Seistan. Its catalog number indicates that it was a part of the same collection as the *seianum* holotype. Both lack dates but were cataloged in 1902. A specimen of *Pipistrellus kuhli* also lacking a date but cataloged in 1913 is also labeled "Seistan" after which someone in a different hand and different color ink has added "Persia." Lay (1967, p. 112) reported finding a colony of approximately 200 *Rhinopoma* in a small cave on the southwest side of Kuh-i-Khwaja about 20 km. SW Zabol. The 22 of these that were collected are *R. muscatellum*. Etemad (1969, p. F175) reported collecting one *P. kuhli* at Zabol during the winter of 1967.

Eisentraut (1959, p. 229) and Etemad (1969, pp. E3, F54) each report a *Rousettus aegyptiacus* specimen from "Baluchistan" with no exact locality. Lay (1967) reported a *Rhinopoma* collected in February 1956 and labeled merely "Baluchistan." I have identified this specimen as *R. muscatellum*.

Blanford (1876, p. 23) reported a *P. kuhli* from Bampur and three *M. emarginatus*, the cotypes of *Vespertilio desertorum*, from Jalk

(=Jalq) (Blanford, 1875, p. 309; 1876, p. 20). Thomas (1920a, p. 933) reported a specimen of *M. emarginatus*, the holotype of *M. lanaceus*, collected on 28 July 1916 at Shastun (=Shaustun). Thomas (1920b) reported a specimen of *R. muscatellum*, the holotype of *R. pusillum*, from Sib. Wroughton (1920, p. 316) reported three *P. kuhli* from Nag.

Lay (1967, p. 143) reported a British Museum specimen of *P. kuhli* collected at Iranshahr on 21 April 1951. The Smithsonian Institution Expedition collected seven *Rhinopoma microphyllum* and 35 *R. muscatellum* from Damin, 30 km. N Iranshahr between 22 and 25 January 1963, and seven *Triaenops persicus* from Nikshahr on 9 and 10 January 1963. Farhang-Azad (pers. comm., 1974) told me of a specimen of *Plecotus austriacus* that he collected at Nikshahr.

A specimen of *Asellia tridens* in the British Museum collection is dated August, 1877 and labeled "Mekran Coast." The Mekran Coast is the Sea of Oman coast of Baluchistan and extends through Iran and Pakistan. Lay (1967, p. 139) included this specimen in his list of Iranian mammals and Siddiqi (1969) included it in his list of the mammals of Pakistan.

Etemad (1969) reported seeing some *R. aegyptiacus* and collecting two *R. muscatellum* at Tiss, 9 km. N Chahabahar (=Chah Bahar). There are two *A. tridens* in the Iran Public Health Research collection from Chah Bahar.

West Azarbaijan Province (WAZ)

West Azarbaijan Province is located in the northwestern corner of Iran. It is bordered by Iraq, Turkey, and the USSR as well as by East Azarbaijan, Zanjan, and Kordistan Provinces. West Azarbaijan is an area of rugged mountains and fertile valleys. The northern Zagros slope down from Turkey across West Azarbaijan to the Rezaiyeh Basin that contains the large saline Lake Rezaiyeh on the border between East and West Azarbaijan Provinces. Major towns and cities in West Azarbaijan Province are, from north to south, Maku, Khvoy, Shahpur, Rezaiyeh, and Mahabad.

Fourteen species of bats have been reported from 20 locations in West Azarbaijan Province. Most of these are the results of the two Street Expeditions.

Andersen (1905) reported a *Rhinolophus hipposideros* from Urmi (=Rezaiyeh). Vereshchagin (1959, pp. 651, 653) mapped records of

Eptesicus serotinus and *Pipistrellus pipistrellus* that Lay (1967, pp. 142, 145) interpreted as being from near Khvoy.

The 1962 and 1968 Street Expeditions both collected bats from several localities in the vicinity of Maku. Approximately 6.5 km. E Maku Lay (1967, p. 89) collected a single *Rhinolophus ferrumequinum* on 28 September 1962 from one of several small, cool, dark caves in the same mountain that sheltered the town. Eight km. NW Maku Lay (1967, p. 90) explored a cave: "about 150 m. up the northern face of the same mountain, a small inconspicuous opening led to a low-ceilinged chamber that continued about 25 m. straight into the mountain, then angled sharply right 15 m. and ended." One *R. hipposideros* was found here on 29 September 1962.

Also on 29 September 1962 Lay (1967, p. 141) collected one *Myotis blythi* from a dry shallow cave 4 km. W Maku. On 3 October 1962 he (Lay, 1967, p. 143) collected a *P. pipistrellus* (Neuhauser and DeBlase, 1971) flying over the Zangamar River near Maku and on 5 October he collected another of the same species flying over a stream 2 km. W Maku. In late September Lay (1967, p. 138) purchased a *R. ferrumequinum* from a boy who said he got it in the town.

Forty-three km. SE Maku Lay (1967, p. 90) found great numbers of *Miniopterus schreibersi* and at least one *Rhinolophus euryale* inhabiting a cave "near the top of a large limestone dome, between two mountain ridges, ... The entrance led immediately into a large, high-ceilinged circular room (ca. 60 x 60 m.). A passage at the back of this chamber led down to a series of tunnels about 30 m. in length. Large cavities existed below these upper tunnels but the small cracks connecting the two would not allow" his passage. He collected 31 *M. schreibersi* from this cave on 1 October 1962.

On 27 September and 2 and 6 October Lay (1967, p. 89) visited a cave just south of the Zangamar River about 1 km. E Maku (fig. 175).

> "The mouth of this cavity gaped 12-15 m. wide and 3 to 4 m. high [fig. 176]. Dry sheep and goat manure of domestic animals covered the floor. This outer chamber narrowed horizontally and vertically toward the rear, so that it became necessary to crawl. Two continuations at the rear, estimated to be 46 m. from the outside entrance and just large enough for a man to crawl through, opened down into a large, cone-shaped, vertical chamber approximately 23 to 25 m. wide. Water dripped from the ceiling accumulating in a rounded depression to percolate through the limestone floor. Fine droplets coated wall and ceiling surfaces and a mixture of red clay and guano had accumulated on the floor. This room maintained a noticeably cooler atmosphere than either the

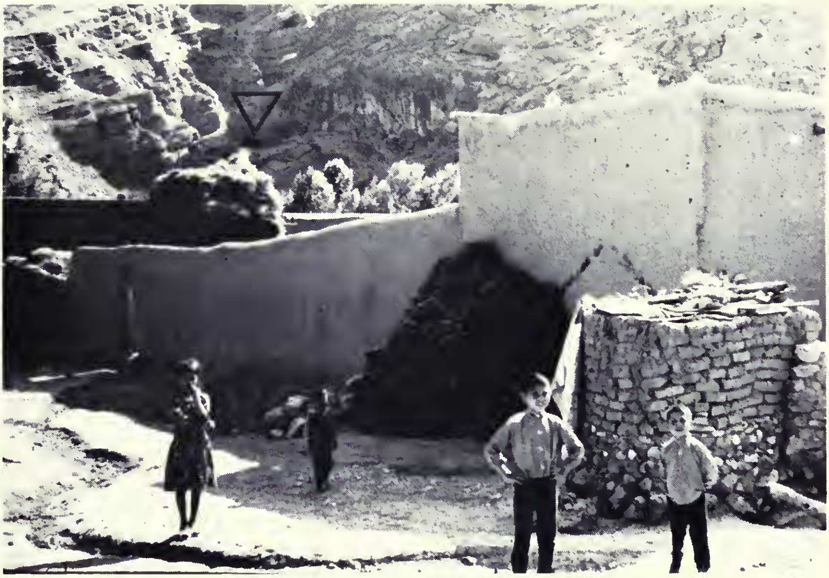

FIG. 175. Zangamar River Cave (arrow) as viewed from the highway about 1 km. E Maku.

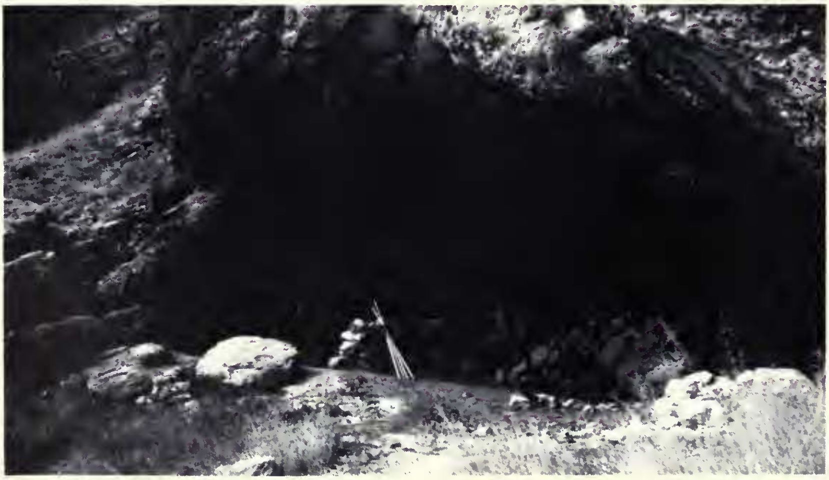

FIG. 176. The entrance to Zangamar River Cave.

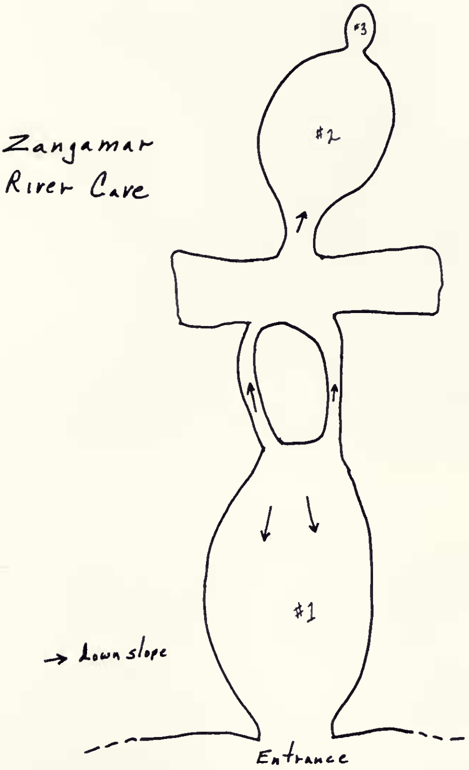

FIG. 177. Diagram of Zangamar River cave redrawn from field notes. For an explanation of the numbers see the text.

> antechamber or the outside environment. The ceiling became cone-shaped 30 to 50 m. above the floor and spiraled out of sight. *Rhinolophus euryale* and *Miniopterus schreibersi*, the former greatly outnumbering the latter, hung, until disturbed, on the walls in this part of the cave."

Lay collected 17 *R. euryale*, four *R. mehelyi* (DeBlase, 1972), and two *M. schreibersi* from this cave.

On 25 July 1968 I visited the same cave and found it essentially as Lay had described it (fig. 177). At the time of my visit the rear chamber (#2 on fig. 177) that he had found full of bats had considerable guano but no bats. The only bat found in the cave was a single *M. blythi* roosting in a small solution hole in the ceiling of the fully illuminated entrance room (#1 on fig. 177). When we attempted to capture this bat, it flew away. On the evening of 28 July I set a mistnet at the entrance to this cave. I saw a few *M. blythi* fly out of the cave. Most avoided the net, but one was captured. The net also captured a *Pipistrellus savii* that was flying into the cave.

I also explored a cave about 200 m. W Zangamar River cave along the same cliff face and visited a cave about 3.7 km. SE Maku, both of which were said by our guides to contain bats frequently. Neither had bats or much sign of bats at the time of our visits.

On 26 July 1968 I visited a tunnel excavated into the face of the huge cliff that overhangs the northern side of Maku. The tunnel, about 2 m. tall and 3 m. wide, was filled with water about knee deep. The water flowed out of the tunnel, under the ruins of old fortifications, and down to the inhabited part of the city. I found no live bats in the tunnel but did find the partly decomposed remains of a *Rhinolophus blasii* floating in the water. As we descended the slope toward the inhabited part of the city, a young boy brought us a freshly dead *Myotis nattereri* that he said he found dead in the nearby garden. A thorough search of the many ruins and crevices in the cliff yielded no further bats or sign of bats.

The Iran Public Health Research Team collected 20 *R. hipposideros* 2 km. E Maku on 22 August 1970. These included lactating females and young of the year.

Both Street expeditions also collected numerous bats in the vicinity of Rezaiyeh. Lay (1967, p. 140) collected two *M. mystacinus* near Rezaiyeh. One was collected (netted?) over water on 24 September 1962, 18 km. SW Rezaiyeh, and the other was found on 14 September hanging in a dimly lit, water-powered grist mill that operated daily 16 km. SW Rezaiyeh.

On 14 September 1962 Lay (1967, p. 93) visited a small man-made room cut into solid rock about 33 km. SSE Rezaiyeh. He found a single *M. blythi* there and was told that "thousands" of bats sometimes inhabit this shelter. On 1 August 1968 we left Rezaiyeh and proceeded 21.7 km. on the Mahabad highway to the village of Balanige, where we took the right fork in the road and proceeded 9.6 km. to Gosenloo village. We continued on the road 1.8 km. beyond the village, then turned right on a dirt track, and drove up the slope. The man-made cave Lay had described was visible about 125 m. up the mountain slope to the right (fig. 178). The entrance was about 1.5 m. tall and 1 m. wide (fig. 179) and opened into a small room about 1.5 m. by 1.5 m. by 2 m. high. Another doorway about .75 m.

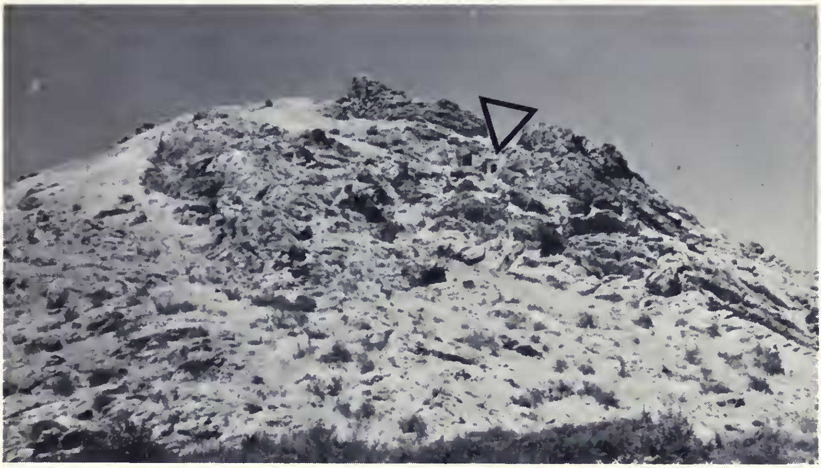

FIG. 178. Man-made rock shelter (arrow) about 33 km. SE Rezaiyeh as viewed from beside the truck.

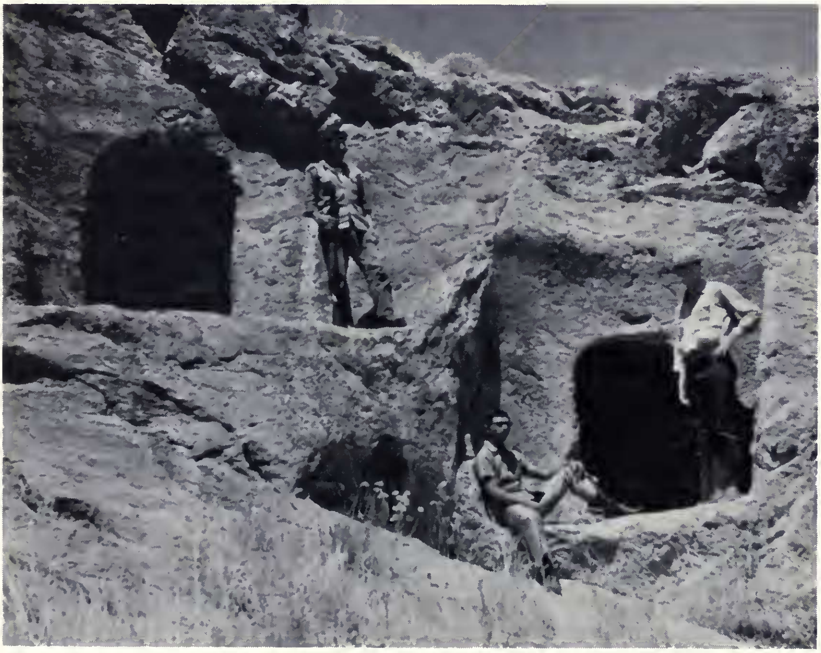

FIG. 179. Entrance, at right, to man-made rock shelter about 33 km. SE Rezaiyeh. The carved area in the rock to the left is only a niche that goes no further than is visible in this photo.

wide by 1.25 m. tall opened into the main room, which was about 2.75 m. by 3.5 m. by 2 m. high. A niche about 1 m. wide, $^2/_3$ m. high, and $^1/_3$ m. deep was centered on the rear wall. The main room was about 15 cm. deeper than the outer room and was filled to this depth with water and straw. The odor of wet sheep droppings was strong. The inner room was in twilight. Several solution holes ranging from 2 to 15 cm. in diameter were present in the ceiling. About 20 *M. blythi* hung on the ceiling of the inner room or roosted up in solution holes. All of the 16 collected were males.

On 4 August 1968 I visited a cave about 16 km. NNW Rezaiyeh. We left Rezaiyeh on the Cerro road and proceeded about 14 km. and turned left on a dirt track. In 1 km. we went right at a "T" intersection onto a lesser track at a small cemetery. We were told we were near Galli village. The cave entrance was about 6 m. wide and 2 m. tall (fig. 180), and a portion of it was walled off for a domestic animal shelter. Two passages opened from the entrance area. The left and larger of the two was about 6 m. wide and 3 m. high. About 12 m. into this passage the floor level rose abruptly about 2 m., forming a ledge across the width of the cave. From the ledge, the passage continued back approximately 12 m. more until the floor and ceiling met. The ceiling was wet throughout this section of the cave and water dripped in several places. Light from the entrance was visible at the rear of the cave. Approximately 15 *R. ferrumequinum* were present in the rear of the cave. We collected four of these and a single *M. blythi* found in a solution hole in the ceiling near the cave entrance. The right-hand passage was small and contained no bats.

On 4 August 1968 a boy brought a single *R. ferrumequinum* into our camp 13.7 km. SW Rezaiyeh. He said he had collected it about an hour's walk away, but our interpreter was not present and no more precise information could be obtained.

The Iran Public Health Research team collected nine *M. blythi* 20 km. S Rezaiyeh (Farhang-Azad, 1970) in 1969. On 28 August 1970 they collected 13 more *M. blythi* and three *R. ferrumequinum* from the same locality (Farhang-Azad, 1971).

On 19 and 21 September 1962 Lay (1967, p. 93) visited Basket Mountain, a granitic monadonock on the west shore of Lake Rezaiyeh north of the town of Rezaiyeh (fig. 44). About 150 m. up the steep east face he found long, narrow cracks in the rock that contained large numbers of *Taphozous nudiventris*. He collected 50 of these bats from these cracks. On 5 August 1968 I visited this same

FIG. 180. Entrance to cave about 16 km. NW Rezaiyeh.

site and found it essentially as Lay had described. We collected seven of the nine *T. nudiventris* found during our relatively brief search.

Yazd Province (YAZ)

Yazd is an arid province located in central Iran. It is bordered by Fars, Esfahan, Khorasan, and Kerman provinces. The city of Yazd is centrally located in the province and the town of Bafq is near the Kerman border. Most of the province is occupied by the southern portion of the Dasht-i-Kavir and the northwestern portion of the Dasht-i-Lut.

Only one species of bat has been collected from one locality in Yazd Province. The Iran Public Health Research team collected four *Rhinolophus blasii* 15 km. S and 6 km. E Yazd on 14 December 1970 (Farhang-Azad, 1971).

Zanjan Province (ZAN)

Zanjan Province is a small province in northwestern Iran. It is bordered by West and East Azarbaijan, Gilan, Central, Hamadan, and Kordistan Provinces. The city of Zanjan, located near the center of the province, is its only major town.

Only four species of bats have been reported from three localities in Zanjan Province. DeFilippi (1865) collected specimens now identified as *Eptesicus serotinus* and *E. bottae* from Zanjan and *E. bottae* from Sar Cham in 1862. In mid-August 1970 the Iran Public Health Research team collected nine *Myotis blythi* and 44 *Miniopterus schreibersi* from 4 km. W Abhar.

GAZETTEER

Below is a listing of place names and co-ordinates used in describing bat collecting sites in Iran. Criteria for the spelling of place names and determination of provincial designations is given in Chapter 3. Province abbreviation codes are explained in Chapter 3 and provinces are mapped in Figure 21. The abbreviations "*ca.*" and "*nr.*" mean "about" or "in the vicinity of."

PLACE	PROVINCE	LATITUDE	LONGITUDE
Abadan	KHU	30°20′N	48°16′E
Abadeh	FAS	31°10′N	52°38′E
Abhar	GIL	36°09′N	49°13′E
Afghan Cave, 110 km. SE Tehran	CEN		
Ahmad Mahmoudi	FAS	28°20′N	53°42′E
Ahram	BSH	28°52′N	51°16′E
Ahvaz	KHU	31°19′N	48°42′E
Ahwaz (=Ahvaz)	KHU	31°19′N	48°42′E
Ali Sard	HAM	35°18′N	48°18′E
Alisard Cave *nr.* Ali Sard	HAM		
Arac Langri *nr.* Malayer	HAM		
Aras River between Iran and USSR	EAZ,WAZ		
Araxe River (=Aras River)			
Ashraf (=Behshahr)	MAZ	36°43′N	53°34′E
Ashurade (=Ashuradeh-ye-Bozorg)	MAZ	36°50′N	53°56′E
Ashuradeh-ye-Bozorg	MAZ	36°50′N	53°56′E
Asporis *nr.* Sari	MAZ		
Astrabad (=Gorgan)	MAZ	36°50′N	54°29′E
Azad Khan Cave *nr.* Mahallat	CEN		
Baba-djabar Cave *nr.* Mahallat	CEN		
Babol	MAZ	36°34′N	52°42′E
Babolsar (=Babol)	MAZ	36°34′N	52°42′E
Badzhistan (=Bejestan)	KHR	34°31′N	58°10′E
Baluchistan (region) SE Iran	SAB	27°00′N	61°00′E
Bampur	SAB	27°12′N	60°27′E
Bamrud	KHR	33°39′N	60°09′E
Bandamir (=Band-e Amir)	FAS	29°47′N	52°51′E

PLACE	PROVINCE	LATITUDE	LONGITUDE
Bandar Abbas	COS	27°11′N	56°17′E
Bandar-e-Gaz	MAZ	36°47′N	53°59′E
Bandar-e-Lengeh	COS	26°33′N	54°53′E
Bandar-e Mashur	KHU	30°33′N	49°12′E
Bandar-e-Pahlavi	GIL	37°28′N	49°27′E
Bandar-e-Shahpur	KHU	30°25′N	49°05′E
Bandar Mahshahr (=Bandar-e Mashur)	KHU	30°33′N	49°12′E
Band-e Amir	FAS	29°47′N	52°51′E
Barforoush (=Babol)	MAZ	36°34′N	52°42′E
Barfurush (=Babol)	MAZ	36°34′N	52°42′E
Basht	KBA	30°21′N	51°09′E
Basket Mountain	WAZ	37°45′N	45°12′E
Bastak	COS	27°14′N	54°22′E
Behbahan (=Behbehan)	KHU	30°35′N	50°14′E
Behbehan	KHU	30°35′N	50°14′E
Behshahr	MAZ	36°43′N	53°34′E
Bejestan	KHR	34°31′N	58°10′E
Beluchistan (=Baluchistan Region)	SAB	27°00′N	61°00′E
Besha Daraz (=Bisheh Deraz)	ILA	32°48′N	46°58′E
Bijar	KOR	35°52′N	47°36′E
Birjand	KHR	32°53′N	59°13′E
Bisheh Deraz	ILA	32°48′N	46°58′E
Bushahr (=Bushehr)	BSH	28°59′N	50°50′E
Bushehr	BSH	28°59′N	50°50′E
Bushire (=Bushehr)	BSH	28°59′N	50°50′E
Canae Gabru Cave *nr.* Tadovan	FAS		
Cara Tarik (=Gara Tarik)	KOR		
Chah Bahar	SAB	25°18′N	60°37′E
Chah Moslem	COS	*ca.* 26°44′N	54°35′E
Chahabahar (=Chah Bahar)	SAB	25°18′N	60°37′E
Chalus	MAZ	36°38′N	51°38′E
Chaman Bid	KHR	37°25′N	56°38′E
Chelmir	KHR	37°23′N	58°48′E
Chelzari, 40 km. SE Abadeh	FAS		
Choga Zambil (Ziggurat) *nr.* Shush	KHU		
Damen (=Damin)	SAB	27°25′N	60°55′E
Damin	SAB	27°25′N	60°55′E
Darab	FAS	28°45′N	54°34′E
Darband	ESN	*ca.* 32°44′N	51°13′E
Darkhovin	KHU	30°50′N	48°29′E
Darkhwein (=Darkhovin)	KHU	30°50′N	48°29′E
Daryacheh-i-Famur (=Famur, Lake)	FAS	29°30′N	51°50′E
Dashbologh, *ca.* 51.5 km.N Divandarreh	KOR		
Dasht	MAZ	37°19′N	56°01′E

PLACE	**PROVINCE**	**LATITUDE**	**LONGITUDE**
Dehloran	ILA	32°41′N	47°16′E
Demavend, Mt.	CEN	35°56′N	52°08′E
Derbent (=Darband)	ESN	*ca.* 32°44′N	51°13′E
Dezful	KHU	32°23′N	48°24′E
Divandarreh	KOR	35°55′N	47°02′E
Dizful (=Dezful)	KHU	32°23′N	48°24′E
Durna (=Duruh)	KHR	32°16′N	60°30′E
Duruh	KHR	32°16′N	60°30′E
Esfahan *or* Isfahan	ESH	32°40′N	51°38′E
Esfideh	KHR	33°39′N	59°46′E
Eshgeft-Raana Cave, 5 km. N Kazerun	FAS		
Eshkaf Dareze Cave at Khurramabad	LOR	33°30′N	48°20′E
Esmailabad	KHR	32°03′N	59°49′E
Estahbanat	FAS	29°08′N	54°04′E
Famur, Daryacheh-i- (=Famur, Lake)	FAS	29°30′N	51°50′E
Famur, Lake	FAS	29°30′N	51°50′E
Faraman	KRS	34°13′N	47°18′E
Galatappeh	ESN	33°13′N	51°45′E
Ganjah Kuh Cave	KHR	37°20′N	56°55′E
Gara Tarik (Cave) *ca.* 4 km. N Qareh	KOR		
Gara Tarik (Cave) *ca.* 53.5 km. N Divandarreh	KOR		
Geh (=Nikshahr)	SAB	26°13′N	60°12′E
Gol Tappen	HAM	35°13′N	48°13′E
Gombad-i-Kabous (=Gonbad-i-Kavus)	KHR	37°17′N	55°17′E
Gonbad-i-Kavus	KHR	37°17′N	55°17′E
Gorgan	MAZ	36°50′N	54°29′E
Guter-Su (=Kutur Su)	EAZ	38°18′N	47°43′E
Haft Tappeh	KHU	*ca.* 32°04′N	48°20′E
Hamadan	HAM	34°48′N	48°30′E
Hamedan (=Hamadan)	HAM	34°48′N	48°30′E
Hessar *nr.* Lotf-abad	KHR		
Hormud-e Bagh	FAS	27°30′N	54°18′E
Ilam	ILA	33°38′N	46°26′E
Iranshahr	SAB	27°13′N	60°41′E
Isfahan *or* Esfahan	ESH	32°40′N	51°38′E
Isfedeh (=Esfideh)	KHR	33°39′N	59°46′E
Isfehden (=Esfideh)	KHR	33°39′N	59°46′E
Ismailabad (=Esmailabad)	KHR	32°03′N	59°49′E

PLACE	PROVINCE	LATITUDE	LONGITUDE
Ispid Lamin	SAB	Not Located	
Izeh	KAU	31°50′N	49°50′E
Jahrom	FAS	28°31′N	53°33′E
Jalk (=Jalq)	SAB	27°36′N	62°41′E
Jalq	SAB	27°36′N	62°41′E
Jangeh, 40.2 km. from Kuh Rang on Shahr Kord Road	CMB		
Jarghun (=Zarghum ? [Lay, 1967, p.125])	FAS	29°48′N	52°44′E
Jask	COS	25°38′N	57°46′E
Jiroft	KRM	27°45′N	58°00′E
Jochdi	KHR	37°20′N	56°50′E
Kaha-Kaha	SAB	30°57′N	61°15′E
Kamaraj	FAS	29°37′N	51°29′E
Kamarij, Dashistan (=Kamaraj)	FAS	29°37′N	51°29′E
Karaftu, cave and cliff dwelling, *nr.* Dashbologh, *ca.* 51.5 km. N Divandarreh	KOR		
Karaj	CEN	35°48′N	50°59′E
Karman (=Kerman)	KRM	30°17′N	57°05′E
Kazerun	FAS	29°37′N	51°38′E
Kazvin (=Qazvin)	CEN	36°16′N	50°00′E
Kerman	KRM	30°17′N	57°05′E
Kermanshah	KRS	34°19′N	47°04′E
Khoramabad (=Khurramabad)	LOR	33°30′N	48°20′E
Khorramshahr	KHU	30°25′N	48°11′E
Khorzaneh Cave *nr.* Hamadan	HAM		
Khurramabad	LOR	33°30′N	48°20′E
Khuzistan, Region	KHU	31°00′N	49°00′E
Khvoy	WAZ	38°33′N	44°58′E
Kirman (=Kerman)	KRM	30°17′N	57°05′E
Kishm Island (=Qeshm Island)	COS	26°45′N	55°45′E
Konar-Takhteh	BSH	29°32′N	51°29′E
Korie Cowat (Cave) *ca.* 25.5 km. NW Ravansar	KRS		
Kuh Rang	CMB	*ca.* 32°18′N	50°13′E
Kuh-i-Khwaja	SAB	30°57′N	61°15′E
Kutur Su	EAZ	38°18′N	47°43′E
Lake Famur (=Famur, Lake)	FAS	29°30′N	51°50′E
Lake Rezaiyeh (=Rezaiyeh, Lake)	WAZ and EAZ	37°40′N	45°30′E
Lar	FAS	27°42′N	54°19′E
Lordegan	CMB	31°31′N	50°48′E
Loft-abad	KHR	37°32′N	59°20′E
Mahalat (=Mahallat)	CEN	33°53′N	50°30′E

PLACE	PROVINCE	LATITUDE	LONGITUDE
Mahallat	CEN	33°53′N	50°30′E
Mahmaudabad	MAZ	36°38′N	52°15′E
Maku	WAZ	39°17′N	44°31′E
Mala-i-Mir (=Izeh)	KAU	31°50′N	49°50′E
Malavy	LOR	33°21′N	47°51′E
Malayer	HAM	34°17′N	48°50′E
Mansorabad	FAS	28°18′N	54°03′E
Mar Ab Canyon, 57 km. W Shahabad on Baghdad Highway	KRS		
Mashhad	KHR	36°18′N	59°36′E
Meher, 48 km. W Sabzevar	KHR		
Mehran	ILA	33°07′N	46°10′E
Meigun	KHR	31°49′N	59°28′E
Mekran Coast, SE Coast of Iran	COS and SAB	from *ca.* 57°E to 62°E	
Meshad (=Mashhad)	KHR	36°18′N	59°36′E
Meshrageh	KHU	*ca.* 30°54′N	49°24′E
Messhad (=Mashhad)	KHR	36°18′N	59°36′E
Minab	COS	27°09′N	57°05′E
Misham (=Mishan)	KHU	30°23′N	49°51′E
Mishan	KHU	30°23′N	49°51′E
Mishen (=Mishan)	KHU	30°23′N	49°51′E
Mohammad Reza Shah National Park	MAZ		
Mohammad Reza Shah Wildlife Park (=Mohammad Reza Shah National Park)	MAZ		
Mohonmerah (=Khorramshahr)	KHU	30°25′N	48°11′E
Moghan	KHR	36°53′N	58°55′E
Moghan Cave *nr.* Moghan	KHR		
Mozduran	KHR	36°09′N	60°35′E
Mozduran Cave *nr.* Mozduran	KHR		
Nag	SAB	27°08′N	61°43′E
Namakdun	COS	26°36′N	55°28′E
Nasrieh (=Ahvaz)	KHU	31°19′N	48°42′E
Nauk-i-Jahan	SAB	26°03′N	60°10′E
Neyriz	FAS	29°12′N	54°19′E
Nik Shahr (=Nikshahr)	SAB	26°13′N	60°12′E
Nikshahr	SAB	26°13′N	60°12′E
Niriz (=Neyriz)	FAS	29°12′N	54°19′E
Nukendzhaga (=Nauk-i-Jahan)	SAB	26°03′N	60°10′E
Nusi	KHR	35°48′N	58°26′E
Pahlavi Dezh	MAZ	37°01′N	54°30′E
Persepolis	FAS	29°57′N	52°52′E
Pol-i-Abgineh	FAS	29°33′N	51°46′E
Porcupine Cave *ca.* 33.1 km. SE Ilam	ILA		

PLACE	PROVINCE	LATITUDE	LONGITUDE
Qareh *ca.* 49.5 km. N Divandarreh	KOR		
Qasr-e Shirim (=Qasr-i-Shirin)	KRS	34°31′N	45°35′E
Qasr-i-Shirin	KRS	34°31′N	45°35′E
Qazvin	CEN	36°16′N	50°00′E
Qeshm Island	COS	26°45′N	55°45′E
Qom	CEN	34°39′N	50°54′E
Qum (=Qom)	CEN	34°39′N	50°54′E
Quyun Daghi Island	EAZ	37°28′N	45°38′E
Rabatak	FAS	29°23′N	51°51′E
Rafsanjan	KRM	30°24′N	56°01′E
Rasht	GIL	37°16′N	49°36′E
Ravansar	KRS	34°43′N	46°40′E
Resht (=Rasht)	GIL	37°16′N	49°36′E
Rezaiyeh (city)	WAZ	37°33′N	45°04′E
Rezaiyeh, Lake	WAZ and EAZ	37°40′N	45°30′E
River Cave (=Korie Cowat) *ca.* 24 km. NW Ravansar	KRS		
Robat-i-Qarabil	KHR	37°19′N	56°26′E
Rood Afshan Caves, 105 km. E Tehran	CEN		
Roudan (=Rudan)	COS	27°26′N	57°12′E
Roudsar (=Rud Sar)	GIL	37°08′N	50°18′E
Rud Sar	GIL	37°08′N	50°18′E
Rudan	COS	27°26′N	57°12′E
Sabalan, Mt.	EAZ	38°15′N	47°49′E
Sabzavar (=Sabzevar)	KHR	36°13′N	57°42′E
Sabzevar	KHR	36°13′N	57°42′E
Sahlabad	KHR	32°10′N	59°51′E
Sa'idabad	KRM	29°28′N	55°42′E
Salehabad (=Sahlabad)	KHR	32°10′N	59°51′E
Sama	MAZ	36°25′N	51°25′E
Sanandaj	KOR	35°19′N	47°00′E
Sang-e-Sar	SEM	35°43′N	53°19′E
Sar Cham	GIL(?)	37°07′N	47°53′E
Sar Dasht *nr.* Lordegan	CMB		
Sari	MAZ	36°34′N	53°04′E
Sarin Ab-Garma Cave *nr.* Dehloran	ILA		
Sartschem (=Sar Cham)	GIL(?)	37°07′N	47°53′E
Seistan, Region, SE Iran	SAB	31°00′N	59°30′E
Shah Abbas Caves *nr.* Kuh Rang	CMB		
Shahabad	KRS	34°06′N	46°31′E
Shahpur Cave	FAS	29°48′N	51°37′E
Shahr Abad, 10 km. E. Mashhad	KHR		

PLACE	PROVINCE	LATITUDE	LONGITUDE
Shahrabad Kaur	KHR	37°29′N	56°46′E
Shahsavar	MAZ	36°49′N	50°53′E
Shandiz	KHR	36°24′N	59°19′E
Shapaur Cave (=Shahpur Cave)	FAS	29°48′N	51°37′E
Shastun (=Shaustun)	SAB	27°23′N	62°20′E
Shaustun	SAB	27°23′N	62°20′E
Shiraz	FAS	29°36′N	52°32′E
Shush	KHU	32°11′N	48°15′E
Shushtar	KHU	32°03′N	48°51′E
Shushter (=Shushtar)	KHU	32°03′N	48°51′E
Siahkal	GIL	37°09′N	49°52′E
Sib	SAB	27°15′N	62°05′E
Sulphur Caves *nr.* Kutur Su	EAZ		
Tadovan	FAS	28°47′N	53°21′E
Tabas	KHR	33°36′N	56°54′E
Tabriz	EAZ	38°05′N	46°18′E
Tabus (=Tabas)	KHR	33°36′N	56°54′E
Tamishan, 20 km. W Mahmaudabad	MAZ		
Tar Divon (=Tadovan)	FAS	28°47′N	53°21′E
Tagiabad (=Tagiabad-e-Shadan)	KHR	32°22′N	59°03′E
Tagiabad-e Shadan	KHR	32°22′N	59°03′E
Tehran	CEN	35°40′N	51°26′E
Telespid	KHU	30°21′N	50°19′E
Tir Tash	MAZ	36°44′N	53°46′E
Tiss	SAB	25°21′N	60°37′E
Torbat-e-Heydariyeh	KHR	36°15′N	59°13′E
Turbat-i-Haidari (=Torbat-e-Heydariyeh)	KHR	36°15′N	59°13′E
Urmi (=Rezaiyeh)	WAZ	37°33′N	45°04′E
Urmiah, Daryacheh-i- (=Rezaiyeh, Lake)	WAZ	37°40′N	45°30′E
Urmiah, Lake (=Rezaiyeh, Lake)	WAZ	37°40′N	45°30′E
Varamin	CEN	35°20′N	51°39′E
Yazd	YAZ	31°53′N	54°25′E
Zabol	SAB	31°02′N	61°30′E
Zangamar River Cave, *ca.* 1 km. E Maku	WAZ		
Zanjan	ZAN	36°40′N	48°29′E
Zarghum	FAS	29°28′N	52°44′E
Zendjan (=Zanjan)	ZAN	36°40′N	48°29′E

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APPENDIX I

MEASUREMENTS OF IRANIAN BATS

Following is a tabular presentation of the measurements of most specimens of bats known from Iran. This includes all specimens in Field Museum of Natural History and most specimens in the British Museum (Natural History), U.S. National Museum of Natural History, Iran National Museum of Natural History, Iran Public Health Research Collection, and numerous smaller collections of Iranian bats that I have examined and measured. Also included are measurements from the literature when these are for a specimen I have not measured or when they are more complete than my personal measurements.

Species are listed in the same order as they appear in the body of this monograph, and specimens are listed in essentially the same order as given in the "Iranian Distribution" section of each species account. If more than one subspecies is recognized in Iran, the subspecies are listed separately.

The first column, "Identification," gives species name, collection, catalog number, and a brief locality statement. A key to the codes used for various collections may be found in Chapter 1. The abbreviation "uncat." following a collection code indicates that the specimen had not been assigned a catalog number by the owning institution at the time I examined it. Where collection codes are not given, the measurements listed are from a literature source that did not mention place of deposition of the specimen. More precise locality information may be found in the individual species accounts or in the gazetteer.

Symbols are used in the column headed "sex" for male (♂), female (♀), and undetermined (?). Five external (TL, T, HF, E, and FA), and seven cranial (GLS, CBL, IO, ZW, C-M^3, C-M_3, and ML) measurements are listed for all specimens on which these measurements have been recorded. Additional measurements are given for particular species as necessary or available. All measurements are given in millimeters. See the "Measurements" section of Chapter 3 for a key to the abbreviations used.

The last column, headed "Remarks," includes a variety of information. Holotypes are indicated, references are presented for measurements taken from the literature, and prevolant or particularly immature individuals are identified. Specimens known to be preserved in a manner other than a standard museum dry skin and skull are indicated by a listing of the method of preservation. Dental or other abnormalities that have been noticed in the course of this study are also mentioned. Where available field numbers are given for uncataloged specimens.

Measurements of Iranian Bats

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Rousettus aegyptiacus																		
FMNH 96447	1.6 km. W Jahrom	♂	147	15	21	25	88	…	39.9	38.0	…	8.0	23.3	…	15.5	16.7	31.0	
96448	1.6 km. W Jahrom	♂	132	16	24	24	90	…	40.2	38.5	…	8.0	24.9	…	15.6	17.1	31.5	
96449	1.6 km. W Jahrom	♂	134	13	24	24	85	…	40.9	38.9	…	8.1	25.2	…	16.0	17.1	32.1	
96450	1.6 km. W Jahrom	♂	132	16	22	22	86	…	39.5	37.9	…	7.9	23.1	…	15.1	17.0	30.9	Skull and skeleton
96452	1.6 km. W Jahrom	♀	126	15	23	24	82	…	37.8	36.1	…	7.5	22.6	…	14.8	16.3	29.9	
96453	1.6 km. W Jahrom	♀	121	12	24	23	83	…	…	…	…	7.4	21.9	…	14.5	16.0	29.1	
96459	1.6 km. W Jahrom	♂	139	12	21	23	92.4	…	…	…	…	…	…	…	…	…	…	Alcohol
96460	1.6 km. W Jahrom	♀	132	11	21	22	87.0	…	…	…	…	…	…	…	…	…	…	Alcohol
96456	Ahmad Mahmoudi	♂	133	10	25	25	90	…	41.9	39.9	…	8.3	25.4	…	16.6	17.8	33.1	
96457	Ahmad Mahmoudi	♀	131	12	24	22	82	…	38.8	…	…	7.7	…	…	14.7	15.9	29.8	
BM 19.11.7.5	Baluchistan	♂	134	14	23	22	…	…	…	…	…	…	…	…	…	…	…	Etemad, 1969, p. F54
FMNH 111008	5.5 km. SW Jahrom	♂	130	10	24	24	85	…	38.5	36.7	…	7.6	22.2	…	15.2	16.0	30.2	
Rhinopoma m. microphyllum																		
BM 2.10.1.6	Telespid	♀	141	60	15.5	22	70.2	…	19.0	…	18.8	2.3	12.6	9.9	7.3	8.1	15.0	
	Shiraz	?	123.5	53.1	14.3	20.3	65.2	…	21	19.4	…	2.7	13	9.6	7.1	8	15.2	Etemad, 1969, pp. 58-59
FMNH 111081	Dehloran	♂	145	53	16	21	68	…	…	…	…	…	…	…	…	…	…	Alcohol
111082	Dehloran	♂	143	53	16	23	70	…	…	…	…	…	…	…	…	…	…	Alcohol
111083	Dehloran	♂	138	51	17	23	70	…	20.7	19.6	…	2.6	12.7	9.7	7.4	8.3	14.9	
111084	Dehloran	♂	143	59	17	22	69	…	20.4	19.9	…	2.9	13.0	…	6.9	…	…	
USNM 369537	8 km. W Estahbanat	♂	147	55	15	24	…	…	…	…	…	…	…	…	…	…	…	
369538	8 km. W Estahbanat	♂	137	49	11	22	…	…	…	…	…	…	…	…	…	…	…	
369539	11 km. NW Darab	♀	133	55	13	23	…	…	…	…	…	…	…	…	…	…	…	
369540	11 km. NW Darab	♀	137	58	14	29	…	…	…	…	…	…	…	…	…	…	…	Lactating
327918	Damin	♀	123	62	16	21	…	…	…	…	…	…	…	…	…	…	…	
327919	Damin	♀	127	61	16	22	…	…	…	…	…	…	…	…	…	…	…	
327920	Damin	♂	125	62	15	24	…	…	…	…	…	…	…	…	…	…	…	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinopoma m. microphyllum																		
USNM 327926	Damin	♀	125	58	14	21	...	...	...	...	...	...	...	...	...	...	...	
327943	Damin	♀	135	53	16	23	...	...	...	...	...	...	...	...	...	...	...	
327945	Damin	♀	136	63	16	24	...	...	...	...	...	...	...	...	...	...	...	
327949	Damin	♀	135	60	16	20	...	...	...	...	...	...	...	...	...	...	...	
IPHR uncat.	Dezful	♂	124	47	13	18	70.1	...	21.0	18.8	...	3.0	13.0	10.5	7.9	...	...	
Rhinopoma m. harrisoni																		
FMNH 96503	Ahmad Mahmoudi	♂	120	53	15	20	66	...	19.5	18.2	...	2.6	11.7	9.0	6.9	7.8	14.0	
BM 26.7.4.1	Mishan	♂	...	...	14	19	66.1	...	19.7	...	18.4	2.6	12.3	10.2	7.0	8.1	14.6	
FMNH 111085	Meshrageh	♂	114	44	14	19	63.0	...	19.7	18.6	...	2.4	11.3	8.0	7.2	7.8	14.0	Paratype of *harrisoni*
USNM 350124	10 km. SE Kazerun	♂	124	52	15	21	63.1	...	19.9	19.0	...	2.5	11.8	8.5	6.8	...	...	Holotype of *harrisoni*
350125	10 km. SE Kazerun		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
350126	10 km. SE Kazerun		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
350129	10 km. SE Kazerun	♂	119	46	14	18	...	...	...	...	...	...	...	...	...	...	...	
350131	10 km. SE Kazerun	♂	113	43	14	22	...	...	...	...	...	...	...	...	...	...	...	
350132	10 km. SE Kazerun	♂	114	43	14	21	...	...	...	...	...	...	...	...	...	...	...	
350133	10 km. SE Kazerun	♂	117	41	15	22	...	...	...	...	...	...	...	...	...	...	...	
350135	10 km. SE Kazerun	♂	120	42	15	21	...	...	...	...	...	...	...	...	...	...	...	
350136	10 km. SE Kazerun	♂	116	48	14	20	...	...	...	...	...	...	...	...	...	...	...	
350137	10 km. SE Kazerun	♂	113	49	13	22	...	...	...	...	...	...	...	...	...	...	...	
FMNH 111086	Canae Gabru Cave	♀	115	45	16	20	65	...	19.6	18.6	...	2.7	11.5	9.0	6.9	...	...	
111087	Canae Gabru Cave	♂	127	46	17	20	65	...	19.4	...	...	2.6	...	...	6.8	7.9	14.1	
111088	Canae Gabru Cave	♂	122	47	17	21	65	...	...	...	...	...	...	...	...	...	...	
111089	Canae Gabru Cave	♂	120	50	16	21	59	...	19.1	18.3	...	2.8	...	9.1	6.7	7.6	14.3	
111090	Canae Gabru Cave	♂	125	48	17	22	65	...	20.2	19.4	...	2.8	12.2	9.3	7.0	8.1	14.8	
111091	Canae Gabru Cave	♂	124	48	16	21	65	...	20.0	19.1	...	2.8	12.2	9.5	7.1	8.1	14.8	
111092	Canae Gabru Cave	♂	125	47	16	22	66	...	19.8	18.9	...	2.8	11.6	9.1	6.7	7.7	14.2	
111093	Canae Gabru Cave	♀	118	42	15	20	64	...	19.7	19.0	...	2.8	...	...	6.9	...	...	
111094	Canae Gabru Cave	♂	116	41	15	20	62	...	19.6	18.7	...	3.0	11.6	...	7.0	...	...	

Identification	Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinopoma m. harrisoni																	
FMNH 111095 Canae Gabru Cave	♂	123	46	16	20	65	...	19.8	18.6	...	2.7	11.5	...	6.6	...	...	
111096 Canae Gabru Cave	♂	123	44	16	20	65	...	19.8	18.8	...	2.6	11.5	...	6.7	...	...	
111097 Canae Gabru Cave	♂	125	45	16	20	64	...	19.7	18.9	...	2.6	11.6	...	6.9	...	...	
111098 Canae Gabru Cave	♀	121	40	16	21	65	...	19.6	18.7	...	2.9	11.7	...	6.9	...	...	
111099 Canae Gabru Cave	♀	123	50	15	20	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111100 Canae Gabru Cave	♀	120	40	15	20	64	...	...	...	...	...	...	...	...	...	...	Alcohol
111101 Canae Gabru Cave	♂	128	47	17	21	67	...	...	...	...	...	...	...	...	...	...	Alcohol
111102 Canae Gabru Cave	♂	125	47	16	20	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111103 Canae Gabru Cave	♂	126	47	16	20	66	...	...	...	...	...	...	...	...	...	...	Alcohol
111104 Canae Gabru Cave	♀	123	46	15	19	64	...	...	...	...	...	...	...	...	...	...	Alcohol
111105 Canae Gabru Cave	♀	118	45	15	19	63	...	...	...	...	...	...	...	...	...	...	Alcohol
111106 Canae Gabru Cave	♂	125	45	16	20	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111107 Canae Gabru Cave	♀	122	46	16	20	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111108 Canae Gabru Cave	♀	122	48	16	18	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111109 Canae Gabru Cave	♀	125	48	16	20	66	...	...	...	...	...	...	...	...	...	...	Alcohol
111110 Canae Gabru Cave	♀	114	42	16	19	62	...	...	...	...	...	...	...	...	...	...	Alcohol
111111 Canae Gabru Cave	♀	145	43	16	20	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111112 Canae Gabru Cave	♀	116	44	16	20	61	...	...	...	...	...	...	...	...	...	...	Alcohol
111113 Canae Gabru Cave	♂	123	47	16	21	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111114 Canae Gabru Cave	♀	106	30	16	21	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111115 Canae Gabru Cave	♀	110	35	16	19	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111116 Canae Gabru Cave	♀	120	42	16	20	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111117 Canae Gabru Cave	♀	120	42	16	20	62	...	...	...	...	...	...	...	...	...	...	Alcohol
USNM 396541 2 km. E Mansorabad	♀	123	51	12	22	...	...	...	...	...	...	...	...	...	...	...	
FMNH 111118 10 km. WNW Bastak	♀	120	51	14	21	63	...	...	...	...	...	...	...	...	...	...	Alcohol
Rhinopoma hardwickei																	
FMNH 96483 Lake Famur	♀	110	55	13	19	47.6	...	...	...	...	2.6	9.3	7.4	5.6	6.4	11.2	
96484 Lake Famur	♂	...	...	12	20	55.9	...	16.9	15.9	...	2.6	9.9	7.9	5.9	6.6	12.0	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Rhinopoma hardwickei																		
FMNH 96485	Lake Famur	♂	123	58	13	19	59.0	...	...	...	...	...	...	...	...	...	...	
111013	Meshrageh	♂	128	63	13	19	59	...	...	...	...	...	...	...	...	...	...	Alcohol
111014	Meshrageh	♀	121	60	14	19	57	...	...	...	...	...	...	...	...	...	...	Alcohol
111015	Meshrageh	♂	134	69	13	18	57.2	...	...	...	...	...	...	...	6.1	6.7	12.0	
111016	Meshrageh	♀	122	61	12	19	53.8	...	17.1	15.7	...	2.8	...	...	5.8	6.5	11.8	
111017	Meshrageh	♀	130	69	13	21	57.8	...	17.5	16.2	...	2.4	9.9	7.9	6.0	6.7	12.1	
111019	Meshrageh	♂	141	76	14	22	59.5	...	...	...	...	...	...	...	5.7	6.7	...	
111020	Meshrageh	♂	137	70	14	20	57.3	...	...	...	...	2.5	...	...	6.1	6.6	12.0	
111021	Meshrageh	♂	136	70	14	21	59.0	...	17.7	16.7	...	2.7	10.5	7.9	6.1	6.8	12.4	
111033	Meshrageh	♂	140	69	14	21	60	...	...	...	...	...	...	...	...	...	...	Alcohol
USNM 350130	10 km. SE Kazerun	♂	126	61	13	19	...	...	...	...	...	...	...	...	...	...	...	
FMNH 111071	10 km. E Chah Moslem	♂	123	61	12	19	52.4	...	18.2	16.9	...	2.9	10.9	8.3	6.3	6.2	11.3	
Rhinopoma m. muscatellum																		
BM 20.1.19.3	Sib	♀	...	51	11	...	46.9	...	15.2	14.4	...	2.3	9.1	7.7	5.2	5.7	10.4	Holotype of *pusillum*
SMNS 4604	Baluchistan	♀	106	57	9.5	17	50.3	...	15.3	14.5	...	2.1	...	7.9	5.5	5.8	10.9	
FMNH 96486	4 km. WSW Jahrom	♂	116	59	11	19	50.1	...	15.8	14.9	...	2.3	9.4	7.4	5.6	5.9	11.0	
96487	4 km. WSW Jahrom	♀	108	57	12	17	47.0	...	15.1	14.1	...	2.4	9.1	7.2	5.3	5.5	10.4	
96488	4 km. WSW Jahrom	♀	108	52	11	19	47.5	...	15.8	14.5	...	2.2	8.6	6.9	5.2	5.6	10.5	
96489	4 km. WSW Jahrom	♂	119	60	12	20	52	...	...	...	...	...	...	...	...	...	...	Skull and skeleton
96490	4 km. WSW Jahrom	♀	117	60	12	19	49.1	...	16.0	14.9	...	2.2	9.5	7.1	5.6	5.9	11.1	
96491	4 km. WSW Jahrom	♀	105	58	11	17	47.9	...	...	...	...	...	...	...	...	...	...	
96492	4 km. WSW Jahrom	♀	112	59	11	19	46.5	...	14.8	14.0	...	2.3	8.5	7.1	5.2	5.6	10.3	
96493	4 km. WSW Jahrom	♂	124	67	12	21	48.1	...	16.4	15.4	...	2.4	9.7	7.5	5.5	5.9	11.2	
96497	4 km. WSW Jahrom	♀	110	60	11	16	47	...	...	...	...	...	...	...	...	...	...	Alcohol
96498	4 km. WSW Jahrom	♂	114	60	11	18	52	...	...	...	...	...	...	...	...	...	...	Alcohol
96499	4 km. WSW Jahrom	♂	118	62	12	19	51	...	...	...	...	...	...	...	...	...	...	Alcohol
96494	Ahmad Mahmoudi	♀	112	57	12	12	49.9	...	16.0	14.9	...	1.9	9.2	7.1	5.4	5.9	10.6	
96495	Ahmad Mahmoudi	♂	106	54	11	18	48.0	...	15.0	14.2	...	2.1	8.4	6.8	5.0	5.5	10.3	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinopoma m. muscatellum																		
FMNH 96496	Ahmad Mahmoudi	♀	110	54	12	19	50.1	...	...	...	...	2.1	9.2	7.3	5.3	5.9	10.8	
	5 km. N Kazerun	?	114.7	61.3	11.2	17.1	50.3	...	15.8	14.5	...	2.6	9.5	...	5.5	...	...	Etemad, 1969, pp. F64-65
IPHR uncat.		♂	111.3	59.5	12	19.4	54.2	...	16	15.3	...	2.8	9.2	...	5.7	...	...	Etemad, 1969, pp. F64-65
uncat.	9 km. N Chah Bahar	♀	...	...	10.5	...	49.4	...	...	...	...	...	...	...	...	...	...	
FMNH 111009	65 km. S Ilam	♂	100	51	13	19	44	...	...	...	...	...	...	...	...	...	...	Alcohol
111010	65 km. S Ilam	♂	113	56	12	18	46	...	...	...	...	...	...	...	...	...	...	Alcohol
111011	65 km. S Ilam	♂	118	64	13	17	49	...	...	...	...	...	...	...	...	...	...	Alcohol
111012	65 km. S Ilam	?	107	51	12	19	44	...	...	...	...	...	...	...	...	...	...	Alcohol
111022	65 km. S Ilam	♀	128	66	12	19	51	...	16.2	15.1	...	...	9.3	7.2	5.3	5.8	11.1	
111023	65 km. S Ilam	♀	115	57	13	17	46	...	...	...	...	...	...	...	...	...	...	Alcohol
111024	65 km. S Ilam	♂	107	52	12	19	44	...	15.6	14.6	...	...	8.8	7.2	5.3	6.0	10.3	
111025	65 km. S Ilam	♂	116	62	13	20	45	...	...	...	...	...	...	...	...	...	...	Alcohol
111026	65 km. S Ilam	♀	115	63	12	18	41.8	...	15.6	14.3	...	2.3	9.2	6.9	5.1	5.8	10.5	
111027	65 km. S Ilam	♀	126	66	12	19	51	...	...	...	...	...	...	...	...	...	...	Alcohol
111028	65 km. S Ilam	♀	126	64	13	18	51.1	...	15.7	14.7	...	2.1	9.4	7.4	5.3	6.2	10.9	
111029	65 km. S Ilam	♀	110	56	12	17	44	...	...	...	...	...	...	...	...	...	...	Alcohol
111030	65 km. S Ilam	♂	122	67	13	20	47.7	...	16.4	15.1	...	2.5	...	7.4	5.4	6.1	10.8	
111031	65 km. S Ilam	♀	109	55	12	18	46	...	...	...	...	...	...	...	...	...	...	Alcohol
111018	Meshrageh	♀	127	65	13	20	49.5	...	16.1	15.2	...	2.2	...	7.6	5.6	6.0	11.0	
111032	Meshrageh	♂	128	70	13	20	49.0	...	...	...	...	...	...	...	...	...	...	Alcohol
111035	Canae Gabru Cave	?	123	66	14	17	49.9	...	16.0	15.1	...	2.1	9.5	7.3	5.4	6.0	11.1	
111036	Canae Gabru Cave	♂	123	57	12	17	51.1	...	16.6	15.7	...	2.2	9.8	7.5	5.7	6.1	11.5	
111037	Canae Gabru Cave	♂	131	62	14	19	51.8	...	16.4	15.5	...	2.3	9.7	7.6	5.6	6.3	11.2	
111038	Canae Gabru Cave	♂	115	51	11	18	49.9	...	16.3	15.4	...	2.1	9.2	7.1	5.5	5.9	11.2	
111039	Canae Gabru Cave	♀	114	52	12	17	49	...	15.6	14.6	...	2.0	9.3	7.2	5.4	5.8	10.7	
111040	Canae Gabru Cave	♂	117	58	12	19	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111041	(sic) Canae Gabru Cave	♂	118	58	11	18	50.0	...	15.9	15.2	...	2.1	...	7.2	5.6	6.0	11.0	
111041	(sic) Canae Gabru Cave	♂	117	63	12	19	50	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M³	C-M₃	ML	Remarks
Rhinopoma m. muscatellum																		
FMNH 111042	Canae Gabru Cave	♀	115	60	12	18	49	...	...	...	...	...	...	...	...	...	...	Alcohol
111043	Canae Gabru Cave	♀	120	64	12	18	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111044	Canae Gabru Cave	♀	112	58	12	17	49	...	...	...	...	...	...	...	...	...	...	Alcohol
111034	6.4 km. W Jahrom	♂	115	56	12	19	48.1	...	16.0	15.2	...	2.1	9.2	7.2	5.5	6.0	10.9	
111045	6.4 km. W Jahrom	♂	110	53	12	18	48	...	...	...	...	...	...	...	...	...	...	Alcohol
111046	6.4 km. W Jahrom	♂	116	55	12	18	...	...	...	...	...	...	...	...	...	...	...	Alcohol
111047	6.4 km. W Jahrom	♂	116	55	12	18	49.0	...	16.3	15.3	...	2.0	9.4	7.3	5.5	6.0	11.2	
111048	6.4 km. W Jahrom	♀	114	56	12	18	48.8	...	15.6	14.8	...	2.1	...	7.2	5.5	6.3	11.0	
111049	6.4 km. W Jahrom	♂	105	57	12	18	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111050	6.4 km. W Jahrom	♀	120	59	12	18	52	...	...	...	...	...	...	...	...	...	...	
111051	Ahmad Mahmoudi	♂	112	57	12	19	48.1	...	15.5	14.8	...	2.2	9.2	7.1	5.5	6.0	10.7	
111052	Ahmad Mahmoudi	♂	113	57	12	18	44.1	...	15.8	14.9	...	...	...	7.2	5.4	6.1	10.8	
111053	Ahmad Mahmoudi	♀	111	50	12	19	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111054	Ahmad Mahmoudi	♀	...	...	12	20	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111055	Ahmad Mahmoudi	♂	123	56	13	20	53	...	...	...	...	...	...	...	...	...	...	Alcohol
111056	10 km. WNW Bastak	♀	117	51	11	18	49.0	...	15.1	14.0	...	2.3	9.1	7.2	5.1	6.0	10.2	
111057	10 km. WNW Bastak	♂	115	55	11	17	49.8	...	...	...	...	2.4	...	7.3	5.7	6.0	11.2	
111058	10 km. WNW Bastak	♂	111	51	11	17	51.3	...	16.2	15.2	...	2.1	9.2	7.2	5.1	6.2	11.1	
111059	10 km. WNW Bastak	♂	116	54	11	17	47	...	15.9	14.9	...	2.2	9.2	7.1	5.5	6.1	10.7	
111060	10 km. WNW Bastak	♀	112	46	11	17	47.2	...	15.4	14.5	...	2.2	8.6	6.9	5.2	5.7	10.3	
111061	10 km. WNW Bastak	♀	117	55	11	18	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111062	10 km. WNW Bastak	♂	107	47	10	17	46.4	...	15.5	14.6	...	2.4	9.0	7.2	5.4	5.8	10.3	
111063	10 km. WNW Bastak	♀	112	48	11	16	47	...	...	...	...	...	...	...	...	...	...	Alcohol
111064	10 km. WNW Bastak	♀	112	53	11	17	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111065	10 km. WNW Bastak	♀	96	46	10	16	46	...	...	...	...	...	...	...	...	...	...	Alcohol
111066	10 km. WNW Bastak	♂	107	52	11	16	49	...	...	...	...	...	...	...	...	...	...	Alcohol
111067	10 km. WNW Bastak	♂	110	51	11	16	52	...	...	...	...	...	...	...	...	...	...	Alcohol
111068	10 km. WNW Bastak	♀	97	43	11	16	46	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M³	C-M₃	ML	Remarks
Rhinopoma m. muscatellum																		
FMNH 111069	10 km. WNW Bastak	♂	105	49	11	16	49	...	...	...	...	...	...	...	...	...	...	Alcohol
111070	10 km. WNW Bastak	♂	...	...	11	19	48	...	...	...	...	...	...	...	...	...	...	Alcohol
112526	10 km. WNW Bastak	♂	106	55	12	20	...	...	...	...	...	...	...	...	...	...	...	Alcohol
112527	10 km. WNW Bastak	♀	109	55	11	18	48	...	...	...	...	...	...	...	...	...	...	Alcohol
111072	10 km. E Chah Moslem	♂	120	61	12	18	50.5	...	16.0	15.2	...	2.3	9.4	7.3	5.4	6.0	11.0	
111073	10 km. E Chah Moslem	♂	120	58	12	20	49.4	...	16.3	15.4	...	2.2	9.5	7.4	5.5	5.8	11.2	
111074	10 km. E Chah Moslem	♂	123	60	12	19	51.5	...	16.2	15.5	...	2.1	9.5	7.3	5.6	6.0	11.3	
111075	10 km. E Chah Moslem	♂	125	62	12	20	50.2	...	...	...	...	...	...	...	...	...	...	Alcohol
111076	10 km. E Chah Moslem	♂	116	55	12	19	51.9	...	...	...	...	...	...	...	...	...	...	Alcohol
111077	10 km. E Chah Moslem	♂	112	52	12	19	51.3	...	...	...	...	...	...	...	...	...	...	Alcohol
111078	10 km. E Chah Moslem	♂	119	60	12	19	51.8	...	...	...	...	...	...	...	...	...	...	Alcohol
111079	10 km. E Chah Moslem	♂	120	58	12	19	52	...	...	...	...	...	...	...	...	...	...	Alcohol
111080	10 km. E Chah Moslem	♂	112	55	13	19	45	...	...	...	...	...	...	...	...	...	...	Alcohol
USNM 350119	10 km. SE Kazerun	♂	113	67	13	20	49.3	9	15.3	14.9	13.8	2.2	8.9	7.9	5.2	5.7	10.7	
350121	10 km. SE Kazerun	♂	121	62	13	20	49.7	8	15.6	...	...	2.1	...	8.0	5.5	5.9	11.0	
350122	10 km. SE Kazerun	♀	...	...	13	20	51.8	9	16.4	15.3	14.5	2.2	9.4	8.1	5.6	5.8	11.2	
350134	10 km. SE Kazerun	♂	123	59	12	20	52.4	8	16.7	15.5	14.8	2.2	9.4	8.1	5.6	6.0	11.7	
327917	Damin	♂	114	65	11	19	52.4	7	16.4	15.4	14.8	2.2	9.6	8.3	5.7	6.1	11.4	
327921	Damin	♀	112	60	12	19	48.6	7	15.3	14.3	13.9	2.0	9.0	7.8	5.4	5.9	10.5	
327922	Damin	♂	116	61	12	19	49.2	8	15.8	14.9	14.2	2.1	9.2	8.1	5.5	6.0	10.8	
327923	Damin	♀	110	59	11	19	...	8	15.7	14.8	14.0	2.1	9.0	7.9	5.3	5.8	10.8	Skeleton
327924	Damin	♀	120	65	12	19	...	7	16.2	15.2	14.2	1.9	8.9	7.9	5.5	6.0	11.2	Skeleton
327927	Damin	♂	115	61	12	19	...	9	16.4	15.4	14.7	2.2	9.4	8.3	5.6	6.1	11.3	Skeleton
327928	Damin	♂	117	61	13	19	...	9	...	...	...	...	...	...	...	...	...	Skeleton
327929	Damin	♂	117	66	13	20	...	8	16.1	15.1	14.4	1.9	9.5	7.9	5.5	5.9	11.1	Skeleton
327931	Damin	♀	110	56	13	19	...	7	15.5	14.4	13.7	2.0	...	7.4	5.4	5.9	10.7	
327932	Damin	♂	122	63	13	20	...	8	16.4	15.5	14.6	2.3	9.6	8.2	5.5	6.1	11.3	Skeleton
327938	Damin	♂	120	63	13	20	...	8	16.0	15.1	14.5	2.3	9.8	8.3	5.6	6.0	11.2	Skeleton

Identification	Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinopoma m. muscatellum																	
USNM 327939 Damin	♂	115	65	13	21	...	8	...	...	...	...	...	...	...	...	...	Skeleton
327940 Damin	♂	112	64	13	19	...	7	...	...	...	...	...	...	...	...	...	Skeleton
327942 Damin	♀	110	52	13	19	...	8	...	...	...	...	...	...	...	...	...	Skeleton
327944 Damin	♀	...	...	...	...	...	...	15.5	14.4	13.7	2.1	...	...	5.3	5.8	10.7	Skeleton
327946 Damin	♂	...	...	...	...	...	...	...	...	14.4	2.2	9.5	8.3	5.5	6.0	11.2	Skeleton
	♂	121	66	13	20	...	8	...	...	...	...	...	...	...	...	...	Alcohol
327948 Damin	♂	116	58	13	19	51.2	8	...	...	...	...	...	...	...	...	...	
327950 Damin	♀	103	47	12	18	48.3	7	...	...	...	...	...	...	...	...	...	Alcohol
327951 Damin	♀	107	53	11	18	49.9	7	...	...	...	...	...	...	...	...	...	Alcohol
327952 Damin	♂	...	...	13	20	51.0	8	...	...	...	...	...	...	...	...	...	Alcohol
327953 Damin	♂	120	62	13	20	52.4	8	...	...	...	...	...	...	...	...	...	Alcohol
327954 Damin	♂	119	62	13	20	50.9	9	...	...	...	...	...	...	...	...	...	Alcohol
327955 Damin	♂	122	63	12	20	51.0	8	...	...	...	...	...	...	...	...	...	Alcohol
327956 Damin	♀	117	60	12	19	51.3	8	...	...	...	...	...	...	...	...	...	Alcohol
327957 Damin	♀	121	63	13	19	51.4	8	...	...	...	...	...	...	...	...	...	Alcohol
327958 Damin	♀	116	61	13	19	50.8	7	...	...	...	...	...	...	...	...	...	Alcohol
327960 Damin	♂	111	55	11	20	52.9	8	...	...	...	...	...	...	...	...	...	Alcohol
327962 Damin	♂	121	62	12	20	51.4	8	...	...	...	...	...	...	...	...	...	Alcohol
327963 Damin	♀	115	58	12	20	...	8	...	...	...	...	...	...	...	...	...	Skeleton
327966 Damin	♂	116	67	13	20	...	9	...	...	...	...	...	...	...	...	...	Skeleton
327967 Damin	♀	110	50	12	18	...	7	15.8	14.8	13.9	2.2	9.4	8.1	5.3	5.8	10.6	Skeleton
327968 Damin	♂	113	59	12	19	...	8	...	...	14.3	2.1	9.2	7.8	5.4	5.9	11.2	Skeleton
327969 Damin	♀	115	60	12	19	...	8	16.0	15.2	14.2	2.2	9.1	7.8	5.4	5.9	11.1	Skeleton
327970 Damin	♂	117	61	12	19	...	8	16.2	15.3	14.5	2.1	9.5	8.1	5.5	5.8	11.2	
327971 Damin	♂	115	63	12	18	...	8	...	...	...	...	...	...	...	...	...	
327972 Damin	♂	114	56	12	19	...	8	16.1	15.3	14.5	2.0	9.2	8.0	5.7	6.0	11.3	Skeleton
327973 Damin	♀	118	66	13	18	...	8	15.6	14.6	14.0	2.3	9.1	7.9	5.3	5.7	10.6	Skeleton
327974 Damin	♀	117	63	12	...	...	8	16.0	15.1	14.3	2.2	9.9	8.4	5.4	6.4	11.2	Skeleton

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Rhinopoma m. muscatellum																		
USNM 327975	Damin	♀	112	60	13	19	...	8	15.7	14.7	14.0	2.1	9.2	8.1	5.5	5.9	10.8	Skeleton
327976	Damin	♀	110	54	12	18	...	8	14.9	14.3	13.5	2.1	8.8	7.7	5.2	5.5	10.6	Skeleton
327977	Damin	♂	116	62	13	18	...	7	...	...	...	...	...	...	...	...	...	Skeleton
327979	Damin	♀	115	62	12	19	...	7	...	...	...	...	...	...	...	...	...	Skeleton
327980	Damin	♀	119	63	13	19	...	8	...	...	...	...	...	...	...	...	...	Skeleton
Rhinopoma m. seianum																		
BM 6.1.2.2.	Seistan	♀	...	57	12	18	49.1	...	15.9	15.2	...	2.0	9.3	...	5.4	6.0	11.0	Holotype of *seianum*
FMNH 96461	Kuh-i-Khwaja	♀	105	56	11	19	46.4	...	...	...	...	2.2	9.3	7.3	5.3	...	10.5	
96462	Kuh-i-Khwaja	♂	116	54	13	21	53.2	...	16.8	15.8	...	2.0	9.7	7.8	5.7	6.2	11.3	
96463	Kuh-i-Khwaja	♀	124	63	12	20	51.3	...	16.5	15.4	...	2.3	9.7	7.5	5.6	6.1	11.3	
96464	Kuh-i-Khwaja	♂	105	52	12	19	46.8	...	16.3	15.2	...	2.4	9.2	7.5	5.8	6.1	11.0	
96465	Kuh-i-Khwaja	♂	109	53	11	19	49.4	...	...	...	...	2.4	9.2	7.4	5.7	6.2	11.0	
96466	Kuh-i-Khwaja	♀	111	61	12	19	49.9	...	...	...	...	2.2	9.0	7.2	5.6	...	10.6	
96467	Kuh-i-Khwaja	♂	115	58	12	20	50.3	...	16.1	15.1	...	2.3	9.5	7.5	5.6	...	11.0	
96468	Kuh-i-Khwaja	♂	116	58	13	20	50.8	...	...	...	...	2.3	9.8	7.5	5.3	6.1	11.4	
96469	Kuh-i-Khwaja	♂	109	55	12	20	47.5	...	16.5	15.2	...	2.5	9.3	7.4	5.7	6.0	11.0	
96470	Kuh-i-Khwaja	♀	115	61	13	19	52	...	...	...	...	...	...	...	...	...	...	Alcohol
96471	Kuh-i-Khwaja	♀	111	56	13	19	50	...	...	...	...	...	...	...	...	...	...	Alcohol
96472	Kuh-i-Khwaja	♀	103	49	13	18	48	...	...	...	...	...	...	...	...	...	...	Alcohol
96473	Kuh-i-Khwaja	♀	102	49	13	19	46	...	...	...	...	...	...	...	...	...	...	Alcohol
96474	Kuh-i-Khwaja	♀	104	51	12	19	49	...	...	...	...	...	...	...	...	...	...	Alcohol
96475	Kuh-i-Khwaja	♀	109	54	13	18	49	...	...	...	...	...	...	...	...	...	...	Alcohol
Taphozous perforatus																		
FMNH 111128	Chah Moslem	♂	103	21	13	21	64.5	...	20.7	19.3	...	4.4	...	10.4	8.4	9.6	15.5	
111600	Minab	♂	103	25	13	20	62	...	...	...	...	...	...	...	...	...	...	Alcohol
Taphozous nudiventris																		
HZM 16.4413	Varamin	♀	133.4	33.3	18	24.2	81.8	...	30.2	26.4	...	5.2	17.3	15.7	11.9	14.6	22.7	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Taphozous nudiventris																		
IPHR uncat.	Varamin	♀	124.7	35.2	19.3	22.0	75.3	...	27.2	25.2	...	5.2	16.3	14.2	11.5	13.1	21.8	
	Varamin	♂	123.2	34.6	17.3	21.8	74.4	...	27.8	...	25.5	...	...	...	11.8	13	21.8	Etemad, 1969, p. F71
UIM 38953	Varamin	♂	125.4	28.2	16.8	24.2	74.4	...	29.9	...	27	5.6	...	...	12	14	21.9	Etemad, 1969, p. F71
	Varamin	♀	133.4	32.6	18.8	25.5	78.8	...	30.1	...	26.1	5.4	17.5	...	12	13.8	21.9	Etemad, 1969, p. F71
FMNH 96504	26 km. NE Rezaiyeh	♂	138	34	21	26	80	...	...	...	26.1	4.9	17.6	...	11.4	13.7	22.7	
96505	26 km. NE Rezaiyeh	♂	135	39	20	27	79	...	...	...	...	...	...	...	...	...	...	
96506	26 km. NE Rezaiyeh	♂	136	35	21	27	85	...	...	...	26.7	5.0	17.7	...	12.0	14.1	22.8	
96507	26 km. NE Rezaiyeh	♂	141	41	23	26	83	...	...	...	...	...	...	...	...	...	...	
96508	26 km. NE Rezaiyeh	♂	140	38	22	26	81	...	...	...	25.4	5.3	18.1	...	11.3	14.0	22.3	
96509	26 km. NE Rezaiyeh	♂	129	34	22	26	81	...	...	...	25.3	5.2	17.8	...	11.3	13.6	22.0	
96510	26 km. NE Rezaiyeh	♂	131	34	20	24	78	...	...	...	26.2	5.3	18.6	...	11.2	13.7	23.3	
96511	26 km. NE Rezaiyeh	♂	133	34	21	25	79	...	30.1	25.9	25.4	5.0	17.5	...	11.2	13.6	22.9	Skull and skeleton
96512	26 km. NE Rezaiyeh	♂	129	37	22	26	79	...	...	...	24.9	5.0	17.8	...	11.1	13.7	21.6	
96513	26 km. NE Rezaiyeh	♂	140	43	21	27	82	...	...	...	25.9	5.0	18.0	...	11.3	13.5	22.8	
96514	26 km. NE Rezaiyeh	♂	134	36	22	26	82	...	31.0	26.7	26.2	5.5	17.4	...	11.3	13.3	22.3	
96515	26 km. NE Rezaiyeh	♂	138	34	20	25	82	...	...	...	25.2	5.3	17.6	...	11.2	13.0	21.7	
96516	26 km. NE Rezaiyeh	♂	134	33	22	26	84	...	30.3	26.4	26.2	5.2	17.7	...	11.7	13.8	22.6	
96517	26 km. NE Rezaiyeh	♂	130	37	19	27	80	...	...	...	...	...	...	...	...	...	...	
96518	26 km. NE Rezaiyeh	♂	130	33	21	25	79	...	...	...	...	...	...	...	...	...	...	
96519	26 km. NE Rezaiyeh	♂	137	36	21	26	80	...	30.2	26.3	25.6	4.8	17.5	...	11.5	13.6	22.3	
96520	26 km. NE Rezaiyeh	♂	141	33	20	27	83	...	29.5	26.3	26.0	5.2	18.1	...	11.3	13.4	22.2	
96521	26 km. NE Rezaiyeh	♂	140	34	21	25	81	...	...	...	25.9	5.1	17.9	...	11.6	13.9	22.4	
96522	26 km. NE Rezaiyeh	♂	137	33	20	26	79	...	...	...	25.4	5.0	17.6	...	11.2	13.9	22.2	
96523	26 km. NE Rezaiyeh	♂	140	33	19	26	82	...	30.0	27.2	26.6	4.8	18.5	...	11.7	14.2	23.1	
96524	26 km. NE Rezaiyeh	♂	134	33	21	27	79	...	...	...	...	...	...	...	...	...	...	
96525	26 km. NE Rezaiyeh	♂	142	38	22	27	84	...	...	...	...	...	...	...	...	...	...	
96526	26 km. NE Rezaiyeh	♂	138	36	21	26	82	...	...	...	25.9	5.3	...	...	11.5	13.8	22.2	
96527	26 km. NE Rezaiyeh	♂	...	...	...	...	...	...	29.6	26.1	25.7	5.5	18.0	...	11.5	14.3	22.6	Skull and skeleton

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Taphozous nudiventris																		
FMNH 96529	26 km. NE Rezaiyeh	♀	135	33	21	24	80	...	...	...	...	...	...	...	...	...	...	Alcohol
96530	26 km. NE Rezaiyeh	♂	136	35	20	27	83	...	...	...	...	...	...	...	...	...	...	Alcohol
96531	26 km. NE Rezaiyeh	♂	140	...	20	24	79	...	...	...	...	...	...	...	...	...	...	Alcohol
96532	26 km. NE Rezaiyeh	♂	145	40	21	27	82	...	...	...	...	...	...	...	...	...	...	Alcohol
96533	26 km. NE Rezaiyeh	♂	132	31	21	25	80	...	...	...	...	...	...	...	...	...	...	Alcohol
96534	26 km. NE Rezaiyeh	♂	137	36	20	25	80	...	...	...	...	...	...	...	...	...	...	Alcohol
96535	26 km. NE Rezaiyeh	♂	129	28	20	25	77	...	...	...	...	...	...	...	...	...	...	Alcohol
96536	26 km. NE Rezaiyeh	♀	135	36	20	25	81	...	...	...	...	...	...	...	...	...	...	
96537	26 km. NE Rezaiyeh	♂	134	35	18	27	79	...	...	...	...	...	...	...	...	...	...	
96538	26 km. NE Rezaiyeh	♂	130	34	19	25	76	...	...	...	...	...	...	...	...	...	...	
96539	26 km. NE Rezaiyeh	♂	137	36	22	28	83	...	...	...	...	...	...	...	...	...	...	
111119	26 km. NE Rezaiyeh	♂	132	34	19	31	79	...	29.5	25.9	24.9	5.1	17.3	...	11.0	13.1	21.8	
111120	26 km. NE Rezaiyeh	♂	137	29	22	27	81.3	...	...	...	...	...	...	...	...	...	...	Alcohol
111121	26 km. NE Rezaiyeh	♂	138	32	19	31	80.3	...	...	...	...	...	...	...	...	...	...	Alcohol
111122	26 km. NE Rezaiyeh	...	142	27	15	26	80	...	...	...	...	...	...	...	...	...	...	Alcohol
111123	26 km. NE Rezaiyeh	♂	140	31	16	26	79	...	...	...	...	...	...	...	...	...	...	Alcohol
111124	26 km. NE Rezaiyeh	♂	143	31	16	26	83	...	...	...	...	...	...	...	...	...	...	Alcohol
111125	26 km. NE Rezaiyeh	♂	143	29	17	26	80	...	30.6	26.5	25.8	5.2	17.7	...	11.4	13.6	21.7	
111126	Bandar-e-Shahpur	♂	123	27	18	25	78	...	26.9	26.0	25.2	5.3	15.4	...	11.5	13.2	21.4	Immature
111127	Bandar-e-Shahpur	♀	132	34	17	25	77	...	27.2	25.2	24.5	5.2	15.5	...	11.4	13.6	21.7	Immature
MMTT 242	26 km. E Haft Tappeh	♂	126	27	18	25	79.1	...	...	...	...	...	...	...	...	...	...	Immature
IPHR 3477	Darkhovin	♂	...	...	...	...	79.2	...	...	...	...	...	...	...	...	...	...	Alcohol
3478	Darkhovin	♂	...	...	...	...	79.6	...	...	...	...	...	...	...	...	...	...	Alcohol
3620	Darkhovin	♂	...	...	...	...	81.0	...	...	...	...	...	...	...	...	...	...	Alcohol
Rhinolophus ferrumequinum																		
BM 20.2.9.1	Shiraz	♂	91	37	12	24	55.3	...	...	...	...	...	...	...	...	...	...	Immature
20.2.9.2	Shiraz	♂	95	40	12	24	55.2	...	...	...	...	...	...	...	...	...	...	Immature
20.2.9.3	Shiraz	♀	104	44	12	26	61.5	...	23.5	...	...	2.6	12.0	10.4	8.5	9.1	16.0	Holotype of *irani*

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Rhinolophus ferrumequinum																		
BM 20.2.9.4	Shiraz	♀	98	40	12	24	27.2	...	...	...	...	...	...	...	...	...	...	Immature
20.2.9.5	Shiraz	♀	95	40	12	25	28.4	...	...	...	...	2.7	...	10.1	8.6	9.1	15.3	Immature
10.6.29.1	Torbat-e-Heydariyeh	?	...	...	11	...	55.4	...	...	...	...	...	...	...	...	...	...	
	110 km. E Mashhad	?	86.9	38.2	11	20	55.3	...	23	...	19.4	2.8	11.6	9.8	8.2	...	...	Etemad, 1969, p. F 80
IUM 38952	34 km. W Mashhad	♂	90.2	37.3	11.3	20.7	56.4	...	23	...	19.6	2.7	11.6	10.1	8.5	...	...	Etemad, 1969, p. F 80
	Azad Khan Cave	♀	60.8	39	10.8	21	56.7	...	22.5	...	20.1	2.8	11.8	...	8.4	...	...	Etemad, 1969, p. F 80
	Shahpur Cave	♂	82.8	29	11.1	22.6	55.2	...	22.3	...	20	2.9	11.4	10.1	8.6	...	...	Etemad, 1969, p. F 80
FMNH 96562	Maku	♂	97	34	13	24	58.0	...	...	...	...	...	...	...	...	...	...	Alcohol
96560	6 km. E Maku	♂	96	38	12	24	60	...	22.2	20.0	19.9	2.6	11.7	...	7.7	8.7	15.6	
96629	Robat-i-Qarabil	♀	91	30	12	25	55	...	22.3	20.1	19.0	2.4	11.2	...	7.8	8.6	14.7	
96630	Robat-i-Qarabil	♀	98	35	12	26	58	...	22.9	20.6	19.6	2.7	...	...	7.7	8.7	15.3	
96631	Robat-i-Qarabil	♂	93	31	13	25	55	...	22.6	20.3	19.0	2.3	11.3	...	7.9	8.9	15.2	
96632	Robat-i-Qarabil	♀	101	37	13	24.5	56	...	22.6	20.1	19.2	2.5	11.3	...	7.8	8.4	15.0	
96633	Robat-i-Qarabil	♂	94	34	11.5	25	52.5	...	22.3	19.9	18.7	2.7	11.1	...	7.7	8.5	14.7	
96634	Robat-i-Qarabil	♂	95	35	12	26	56	...	22.6	20.3	19.6	2.6	11.2	...	8.1	8.8	15.1	
96636	Ganjah Kuh	♀	99	38	12	25	57	...	22.9	20.3	19.1	2.5	11.2	...	8.2	8.6	14.9	
96637	Ganjah Kuh	♀	107	36	11	25	57	...	22.5	20.1	19.3	2.4	11.8	...	7.8	8.6	15.0	
96638	Ganjah Kuh	♀	103	35	12	25	57	...	21.8	20.1	19.0	2.7	11.6	...	7.6	8.9	14.7	
96639	Ganjah Kuh	♂	98	37	13	25	57.5	...	...	...	...	...	...	...	...	...	...	
96640	Chaman Bid	♂	102	36	12	24	55.2	...	...	...	...	...	...	...	...	...	...	
96641	Chaman Bid	♂	96	32	11	25	56.2	...	...	...	...	...	...	...	...	...	...	
96642	Chaman Bid	♀	...	...	13	24	55.1	...	...	...	...	...	...	...	...	...	...	
96643	Chaman Bid	♀	94	30	12	23	56.2	...	...	...	...	...	...	...	...	...	...	
96644	Chaman Bid	♂	92	33	12	23	53	...	...	...	...	...	...	...	...	...	...	Alcohol
96645	Chaman Bid	♀	95	31	12	21	55.5	...	...	...	...	...	...	...	...	...	...	Alcohol
96646	Chaman Bid	♀	96	37	12	25	55.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96647	Chaman Bid	♂	95	36	11	24	56.9	...	...	...	...	...	...	...	...	...	...	Alcohol
96648	Chaman Bid	♂	92	34	12	24	56.5	...	...	...	...	...	...	...	...	...	...	Alcohol
96649	Galatappeh	♂	102	38	12	24	59	...	22.9	20.7	19.7	2.5	...	...	8.3	8.9	15.3	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Rhinolophus ferrumequinum																		
IPHR 718	Chelmir	♂	...	...	...	...	54.6	...	...	...	...	...	...	...	...	...	...	Alcohol
1027	71 km. SE Mashhad	♀	...	...	...	...	56.8	...	...	...	...	...	...	...	...	...	...	Alcohol
1028	71 km. SE Mashhad	♀	...	...	...	...	53.4	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
1029	71 km. SE Mashhad	♂	...	...	...	...	51.2	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
1030	71 km. SE Mashhad	♀	...	...	...	...	54.9	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
3127	20 km. S Rezaiyeh	♀	...	...	...	...	58.0	...	...	...	...	...	...	...	...	...	...	Alcohol
3128	20 km. S Rezaiyeh	♂	...	...	...	...	56.5	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 111194	16.1 km. NNW Rezaiyeh	♀	95	36	12	29	57	...	22.6	20.0	19.1	2.8	11.2	...	8.0	8.8	15.0	Alcohol, immature
111195	16.1 km. NNW Rezaiyeh	♀	109	35	12	24	55	...	...	...	...	...	...	...	...	...	...	Alcohol
111196	16.1 km. NNW Rezaiyeh	♂	89	38	12	25	57	...	...	...	...	...	...	...	...	...	...	Immature
111197	16.1 km. NNW Rezaiyeh	♀	111	42	12	23	61	...	...	...	...	...	...	...	...	...	...	Alcohol
111198	13.7 km. SW Rezaiyeh	♀	100	38	13	23	58	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111199	57 km. W Shahabad	♂	115	30	13	22	55	...	22.4	...	19.8	2.7	...	...	7.9	9.0	15.3	
111200	57 km. W Shahabad	♂	95	28	...	22	55	...	...	...	...	...	...	...	...	...	...	Alcohol
111201	57 km. W Shahabad	?	117	38	13	22	58	...	...	...	...	...	...	...	...	...	...	Alcohol
111202	57 km. W Shahabad	♂	116	27	13	25	60	...	23.4	20.9	19.8	2.8	11.7	...	8.6	9.4	15.6	
111203	57 km. W Shahabad	♂	112	38	13	21	58	...	...	...	...	...	...	...	...	...	...	Alcohol
111204	57 km. W Shahabad	♀	116	37	13	22	58	...	23.3	20.7	19.9	2.5	12.2	...	8.5	9.4	15.8	
111205	57 km. W Shahabad	♀	115	38	13	25	60	...	23.0	20.6	19.9	2.5	11.8	...	8.2	9.8	15.5	
111206	57 km. W Shahabad	♂	116	40	14	24	57	...	22.7	20.0	19.7	2.7	11.7	...	8.3	9.1	14.9	
111207	57 km. W Shahabad	♀	114	40	14	26	55	...	...	...	...	2.8	11.8	...	8.2	9.2	15.5	
111208	57 km. W Shahabad	♂	102	35	12	22	55	...	22.4	19.8	19.3	2.5	11.2	...	8.2	9.0	15.2	
111209	57 km. W Shahabad	♀	110	36	12	23	60	...	...	...	...	...	...	...	...	...	...	Alcohol
111210	57 km. W Shahabad	♀	108	36	13	26	60	...	22.2	20.0	19.6	2.5	11.7	...	8.1	9.0	...	
111211	57 km. W Shahabad	♀	105	37	14	22	58	...	22.7	20.7	19.2	2.5	11.5	...	7.8	8.8	15.2	
111212	57 km. W Shahabad	♀	110	35	13	25	58	...	22.4	...	...	2.7	...	...	7.9	8.8	15.5	
111213	57 km. W Shahabad	♀	100	30	13	25	61	...	...	...	...	...	...	...	...	...	...	Alcohol
111214	57 km. W Shahabad	♀	105	35	12	24	61	...	...	...	...	...	...	...	...	...	...	Alcohol
111215	57 km. W Shahabad	♂	108	36	12	24	60	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinolophus ferrumequinum																		
FMNH 111216	57 km. W Shahabad	♂	...	...	...	...	54.6	...	...	...	...	...	...	...	...	...	...	Alcohol
111217	57 km. W Shahabad	♀	110	34	14	23	52	...	...	...	...	...	...	...	...	...	...	Alcohol
111218	57 km. W Shahabad	♀	110	36	12	20	55	...	...	...	...	...	...	...	...	...	...	Alcohol
111219	57 km. W Shahabad	♂	...	...	10	21	55	...	...	...	...	...	...	...	...	...	...	Alcohol
111220	57 km. W Shahabad	♀	106	33	12	23	55	...	...	...	...	...	...	...	...	...	...	Alcohol
111221	57 km. W Shahabad	?	...	...	...	22	58	...	...	...	...	...	...	...	...	...	...	Alcohol
111222	3.2 km. N Khurramabad	♀	107	43	12	23	59	...	22.1	20.0	19.5	2.7	11.6	...	8.3	9.1	15.5	
111223	3.2 km. N Khurramabad	♀	105	35	11	25	56	...	...	...	...	...	...	...	...	...	...	Alcohol
111224	3.2 km. N Khurramabad	♂	111	41	11	24	57	...	23.2	20.6	20.0	2.5	11.5	...	8.1	8.8	15.5	
111191	Shahpur Cave	♂	95	34	11	27	55	...	...	...	...	...	...	...	...	...	...	Alcohol
111192	Shahpur Cave	♀	106	38	12	25	56	...	22.7	20.3	18.9	2.3	11.3	...	7.8	9.0	15.0	P^1 absent on both sides
111193	Shahpur Cave	♂	102	37	12	25	58	...	22.6	...	...	2.7	11.3	...	7.5	8.7	15.0	
111225	about 50 km. E Sa'idabad	♀	109	37	11	27	61	...	23.0	20.6	19.7	2.6	11.7	...	8.3	8.9	15.5	
MMTT uncat.	Tir Tash	♀	96	35	12	23	58.5	...	...	...	...	...	...	...	...	...	...	Alcohol (Bat 17)
uncat.	Tir Tash	♀	96	35	11	22	58.4	...	...	...	...	...	...	...	...	...	...	Alcohol (Bat 18)
SMF 46678	Mozduran	♂	100	34	11	24	54	...	22.1	19.0	...	...	11.6	...	8.4	...	...	Felten, pers. comm., 1975
46679	Mozduran	♂	94	34	11	23	53	...	21.8	19.4	...	...	11.3	...	8.1	...	...	Felten, pers. comm., 1975
Rhinolophus bocharicus																		
IPHR uncat.	Chelmir	...	82	29	11	15	49.9	...	...	...	...	3.2	...	9.6	7.7	8.2	12.5	P^1 absent, immature
Same specimen as above			..	82	29	11	15.9	52.0	...	...	18.1	...	2.4	9.5	...	7.8	9.8	Farhang Azad (1969)
Rhinolophus hipposideros minimus?																		
	Asporis nr. Sari	?	65.7	26.7	7.8	14.9	37.8	...	...	...	13.8	1.8	7.3	...	4.8	...	...	Etemad, 1969, pp. F85-86
FMNH 96650	Chalus	♂	61	26	8	15	37.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96651	Chalus	♀	65	24	9	16	38.8	...	...	...	...	...	...	...	...	...	...	Alcohol
96652	Chalus	♀	65	28	9	16	38.6	...	...	...	...	...	...	...	...	...	...	Skull missing
96653	Chalus	♀	64	27	9	17	...	...	...	...	...	...	...	...	...	...	...	Skull missing
96654	Chalus	♀	67	27	8	16	36.9	...	...	...	...	...	...	...	...	...	...	Skull missing

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Rhinolophus hipposideros minimus?																		
FMNH 96655	Chalus	♀	66	27	9	17	37.5	...	...	...	...	...	...	...	...	...	...	Skull missing
96656	Chalus	♂	66	26.5	9	17	36.8	...	...	...	...	...	...	...	...	...	...	Skull missing
96657	Chalus	♀	67	29	9	16	38.7	...	...	...	...	...	...	...	...	...	...	Skull missing
96658	Chalus	♀	67	26	9	17	38.6	...	...	...	...	...	...	...	...	...	...	Skull missing
96659	Chalus	♂	63	25	9	16	36.5	...	...	...	...	...	...	...	...	...	...	Skull missing
96660	Chalus	♂	65	26	8	16	36.7	...	...	...	...	...	...	...	...	...	...	Skull missing
96661	Chalus	♀	60	25	9	15	38.4	...	...	...	...	...	...	...	...	...	...	Skull missing
96662	Chalus	♂	64	26	8.5	17	35.7	...	...	...	...	...	...	...	...	...	...	Skull missing
96663	Chalus	♀	65	25	8	16	37.3	...	...	...	...	...	...	...	...	...	...	Skull missing
96664	Chalus	♀	61	25	8	17	37.6	...	...	...	...	...	...	...	...	...	...	Skull missing
96665	Chalus	♀	60	28	9	16	37.4	...	...	...	...	...	...	...	...	...	...	Skull missing
96666	Chalus	♀	64	24	8.5	16.5	37.9	...	...	...	...	...	...	...	...	...	...	Skull missing
BM 27.10.26.1	Babol	♂	61	23	8	15	38.2	...	...	...	...	...	...	...	...	...	...	Skull missing, Immature
MMTT uncat.		♂	64	21	11	18	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
USNM 340949	20 km. W Mahmaudabad	♀	61	24	9	15	34.0	...	...	...	...	...	...	...	...	...	...	Prevolant
340950	20 km. W Mahmaudabad	♀	72	30	9	16	36.5	...	...	...	...	...	...	...	...	...	...	
340951	20 km. W Mahmaudabad	♂	67	29	8	18	38.0	...	...	...	...	...	...	...	...	...	...	Prevolant?
340952	20 km. W Mahmaudabad	♂	76	30	9	17	38.8	...	...	...	...	...	...	...	...	...	...	
Rhinolophus h. midas																		
BM 94.11.16.1	Jask	♀	...	24.5	7.6	17	37.7	...	16.0	14.7	13.8	1.6	7.4	7.2	5.6	5.8	10.3	Alcohol, Holotype of *midas*
99.9.13.2	Rezaiyeh	♂	...	30	8	17	39.8	...	...	...	...	...	...	...	5.3	5.4	10.0	Alcohol
	Azad Khan Cave	♀	64.0	25.3	6.9	13.9	38.9	...	...	...	13.0	1.9	7.8	...	4.6	...	...	Etemad, 1969, pp. F85-86
	Azad Khan Cave	♂	70.3	30.3	7.8	16.3	39.6	...	...	...	13.9	1.9	7.7	...	...	...	...	Etemad, 1969, pp. F85-86
FMNH 96667	8 km. NW Maku	♀	62	24	8	18	39.0	...	...	...	13.2	1.9	7.6	6.6	5.1	5.4	9.7	
IPHR 3022	2 km. E Maku	♂	...	...	...	...	37.3	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3023	2 km. E Maku	♂	...	...	...	...	36.0	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3024	2 km. E Maku	♂	...	...	...	...	37.9	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinolophus h. midas																		
IPHR 3025	2 km. E Maku	♀	...	...	...	...	37.8	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3026	2 km. E Maku	♂	...	...	...	...	36.8	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3027	2 km. E Maku	♀	...	...	...	...	36.4	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
3028	2 km. E Maku	♀	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
3029	2 km. E Maku	♀	...	...	...	...	37.5	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
3030	2 km. E Maku	♀	...	...	...	...	37.5	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
3031	2 km. E Maku	♂	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3032	2 km. E Maku	♀	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3033	2 km. E Maku	♀	...	...	...	...	37.6	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3034	2 km. E Maku	♀	...	...	...	...	38.3	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3035	2 km. E Maku	♀	...	...	...	...	39.0	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
3036	2 km. E Maku	♀	...	...	...	...	38.6	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
3037	2 km. E Maku	♀	...	...	...	...	39.2	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3038	2 km. E Maku	♂	...	...	...	...	37.6	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3039	2 km. E Maku	♀	...	...	...	...	37.7	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
3040	2 km. E Maku	♀	...	...	...	...	38.0	...	...	...	...	...	...	...	...	...	...	Immature, Alcohol
3041	2 km. E Maku	♀	...	...	...	...	38.3	...	...	...	...	...	...	...	...	...	...	Mammae enlarged, Alcohol
USNM 350138	10 km. SE Kazerun	♂	68	24	8	18	37.0	...	...	...	...	...	...	...	...	...	...	
350139	10 km. SE Kazerun	♂	66	26	9	18	37.6	...	...	...	...	...	...	...	...	...	...	
350140	10 km. SE Kazerun	♂	64	22	9	18	36.2	...	...	...	...	...	...	...	...	...	...	
350141	10 km. SE Kazerun	♂	...	...	9	18	35.9	...	...	...	...	...	...	...	...	...	...	Tail missing

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Rhinolophus h. midas																		
FMNH 111188	14.5 km. NE Kermanshah	♂	73	29	8	19	39	...	16.2	14.3	13.7	2.0	...	6.8	5.1	6.0	10.0	
111183	Shahpur Cave	♀	70	28	7	16	37	...	15.8	14.2	13.0	1.6	7.5	6.7	5.0	5.7	9.5	
111184	Shahpur Cave	♀	71	26	8	19	39	...	15.5	14.3	13.7	1.5	7.5	6.6	5.0	5.5	9.6	
111185	Shahpur Cave	♀	72	32	7	17	39	...	...	...	...	...	...	...	...	...	...	
111186	Shahpur Cave	♀	72	24	8	17	40	...	...	...	...	...	...	...	...	...	...	Alcohol
111187	Shahpur Cave	♀	71	30	8	17	37	...	...	...	...	...	...	...	...	...	...	Alcohol
111189	Canae Gabru Cave	♀	74	31	8	17	40	...	...	...	...	...	...	...	...	...	...	
111190	Canae Gabru Cave	♂	74	31	8	17	39	...	16.1	15.0	13.7	1.6	7.7	6.6	5.5	5.7	10.1	
Rhinolophus euryale																		
BM 66.3214	Shah Abbas Caves	♂	80	26	10	20	48.9	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 96540	Maku	♀	76	27	11	23	50	...	19.1	17.0	15.7	2.2	9.4	8.8	5.8	6.6	12.0	
96542	Maku	♀	78	24	11	22	48.5	...	...	...	...	2.4	...	8.8	5.8	6.5	12.0	
96544	Maku	♀	82	26	10	21	48	...	19.0	16.8	15.7	2.4	9.6	8.9	6.0	6.8	12.0	
96545	Maku	♀	83	29	11	23	50	...	19.0	16.9	16.0	2.3	9.4	8.7	6.0	6.6	11.9	
96546	Maku	♀	85	25	11	22	49.5	...	...	...	15.8	2.2	...	8.8	6.0	6.7	12.0	
96547	Maku	♂	81	28	11	23	50	...	19.4	17.0	16.4	2.4	9.7	9.0	6.3	6.8	12.2	
96548	Maku	♀	84	28	11	22	51	...	...	...	...	2.3	9.5	9.0	6.3	6.9	12.0	
96549	Maku	♀	79	28	11.5	23	49	...	...	...	...	...	...	...	...	...	...	
96551	Maku	♀	83	28	11	24	50	...	...	...	...	...	...	...	...	...	...	
96552	Maku	♀	78	23	11	22	51	...	...	...	...	...	...	...	...	...	...	Alcohol
96553	Maku	♀	...	24	10	20	48.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96555	Maku	♂	84	26	11	20	49.5	...	...	...	...	...	...	...	...	...	...	Alcohol
96556	Maku	♂	80	27	11	22	51.4	...	...	...	...	...	...	...	...	...	...	Alcohol
96557	Maku	♂	80	23	10	19	47	...	...	...	...	...	...	...	...	...	...	Alcohol
96558	Maku	♂	78	27	11	23	49	...	...	...	...	...	...	...	...	...	...	Alcohol
96559	Maku	♂	80	26	12	22	48	...	...	...	...	...	...	...	...	...	...	Alcohol
96561	Maku	♂	...	25	10	20	48.5	...	19.1	16.8	15.7	2.1	9.4	8.7	5.9	6.6	11.7	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M³	C-M₃	ML	Remarks
Rhinolophus euryale																		
	Behbehan	♂	67	24	8.3	19.1	46.6	...	18.3	...	16.2	2.3	9	...	6.4	...	...	Etemad, 1969, pp. F89-90
	Hamadan	♀	75.3	29	9.9	18.1	46	...	18.3	...	16.2	2.3	9.4	...	6.3	...	...	Etemad, 1969, pp. F89-90
IPHR 1031	71 km. SE Mashhad	♂	...	...	...	...	48.3	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 111170	Canae Gabru Cave	♂	91	31	11	21	48	...	19.1	17.6	15.6	2.3	9.3	8.8	5.8	7.2	12.1	
111171	Canae Gabru Cave	♀	94	31	11	20	48	...	18.7	16.7	15.5	2.1	9.1	8.4	5.9	6.5	11.9	
111172	Canae Gabru Cave	♂	...	32	11	22	48	...	19.0	16.8	15.7	2.3	...	8.5	5.8	6.5	11.9	
111173	Canae Gabru Cave	♂	92	31	11	21	48	...	19.0	16.9	15.8	2.2	9.2	8.6	5.8	6.7	11.9	
111175	Canae Gabru Cave	♂	94	31	11	21	48	...	18.9	16.5	15.5	2.2	9.3	8.8	5.7	6.5	11.8	
111176	Canae Gabru Cave	♀	92	32	11	22	48	...	19.4	17.3	15.9	2.3	9.6	8.9	5.9	6.7	12.1	
111177	Canae Gabru Cave	♀	90	31	11	21	48	...	...	...	...	...	...	...	...	...	...	Alcohol
111179	Canae Gabru Cave	♀	86	31	11	22	48	...	...	...	...	...	...	...	...	...	...	Alcohol
111181	Canae Gabru Cave	♂	85	30	10	20	48	...	...	...	...	...	...	...	...	...	...	Alcohol
UMM 117562	30 km. NE Bijar	♀	85	33	12	23	49	...	...	...	...	...	...	...	...	...	...	Alcohol
117563	30 km. NE Bijar	♂	78	30	11	23	46	...	...	...	...	...	...	...	...	...	...	Alcohol
SMF 46680	Mozduran	♂	81	29	9	20	48	...	18.8	16.4	...	...	9.6	...	6.3	...	...	
46681	Mozduran	♂	81	28	8	23	48	...	18.8	16.4	...	...	9.7	...	6.5	...	...	
46682	Mozduran	♂	82	29	9	22	48	...	18.8	16.5	...	...	9.5	...	6.4	...	...	
46683	Mozduran	♂	73	23	8	20	46	...	18.9	16.6	...	...	9.4	...	6.4	...	...	
46684	Mozduran	♂	76	29	10	22	48	...	18.6	16.5	...	...	9.5	...	6.4	...	...	
46685	Mozduran	♂	78	29	9	22	47	...	18.6	16.4	...	...	9.6	...	6.4	...	...	
46687	Mozduran	♀	77	26	9	22	46	...	18.3	16.1	...	...	9.4	...	6.3	...	...	
Rhinolophus mehelyi																		
BM 66.3211	Shah Abbas Caves	♂	85	24	11	21	51.1	...	...	...	...	...	...	...	...	...	...	Alcohol
66.3212	Shah Abbas Caves	♂	82	24	10	22	50.7	...	...	...	...	...	...	...	...	...	...	Alcohol
66.3213	Shah Abbas Caves	♀	88	24	12	22	51.7	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 96541	Maku	♀	88	29	11	22	52	...	19.4	...	...	2.4	10.3	9.0	6.6	7.0	12.4	
96543	Maku	♀	82	27	11	23	50	...	19.9	17.5	16.7	2.4	10.1	9.2	6.2	7.1	12.5	
96550	Maku	♀	83	26	11.5	23.5	53	...	...	...	...	...	...	...	...	...	...	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Rhinolophus mehelyi																		
FMNH 96554	Maku	♂	90	26	11	...	46.0	...	...	...	...	...	...	...	...	...	...	Alcohol
96614	Shahpur Cave	♀	82	28	12	23	52	...	20.2	18.1	16.9	2.4	10.3	9.5	6.5	7.1	13.0	
96615	Shahpur Cave	♂	83	27	12	22	49	...	...	...	...	...	...	...	...	...	...	
96616	Shahpur Cave	♂	72	25	10	21	43	...	19.3	17.2	16.1	2.4	10.0	9.1	6.1	7.1	12.4	
96617	Shahpur Cave	♂	79	26	11	21	48	...	20.1	17.7	16.4	2.4	10.0	9.3	6.3	7.0	12.6	
96618	Shahpur Cave	♀	78	26	11	23	51	...	22.2	17.9	17.0	2.4	10.5	9.7	6.3	7.2	13.1	
96619	Shahpur Cave	♂	83	26	12	22	59	...	20.0	17.7	16.9	2.6	10.6	9.4	6.9	7.4	12.7	
96621	Shahpur Cave	♀	72	22	12	23	48	...	19.9	17.4	16.7	2.4	10.5	9.5	6.2	7.2	13.0	
96622	Shahpur Cave	♂	83	22	11	22	51.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96623	Shahpur Cave	♂	78	21	11	22	51.7	...	...	...	...	...	...	...	...	...	...	Alcohol
96624	Shahpur Cave	♂	80	22	12	22	52.9	...	...	...	...	...	...	...	...	...	...	Alcohol
96625	Shahpur Cave	♀	74	20	12	23	50.5	...	...	...	...	...	...	...	...	...	...	Alcohol
96626	Shahpur Cave	♀	84	26	10	21	52.1	...	...	...	...	...	...	...	...	...	...	Alcohol
96627	Shahpur Cave	♂	84	27	12	22	51.2	...	...	...	...	...	...	...	...	...	...	Alcohol
101989	Shahpur Cave	?	...	...	...	...	47.5	...	...	...	16.3	...	9.4	...	6.3	...	...	
111129	Gara Tarik Cave	♀	83	31	12	21	51	...	19.9	17.7	16.4	2.5	10.0	9.4	6.2	7.0	12.5	Immature
111130	Gara Tarik Cave	♂	89	23	11	23	52	...	...	...	16.3	2.5	10.3	9.3	6.0	7.2	12.5	Immature
111131	Gara Tarik Cave	♀	87	28	12	23	52	...	19.6	17.0	16.5	2.3	...	9.4	6.2	7.1	...	Immature
111132	Gara Tarik Cave	♀	83	29	10	21	52	...	19.4	17.2	16.2	2.6	10.1	9.2	6.6	7.1	12.8	Immature
111133	Gara Tarik Cave	♀	87	26	11	21	51	...	19.8	17.4	16.3	2.5	10.4	9.3	6.3	7.1	12.6	Lactating
111134	Gara Tarik Cave	♂	84	29	12	20	...	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111135	Gara Tarik Cave	♂	76	28	12	20	51	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111136	Gara Tarik Cave	♀	88	30	12	21	52	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111137	Gara Tarik Cave	♀	87	27	12	20	52	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111138	Gara Tarik Cave	♀	84	26	11	21	54	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111139	Gara Tarik Cave	♀	79	22	12	20	51	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111140	Gara Tarik Cave	♀	84	30	12	21	51	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
111141	Gara Tarik Cave	♀	95	33	11	21	52	...	...	...	...	...	...	...	...	...	...	Immature
111142	Gara Tarik Cave	♀	93	31	11	21	50	...	...	...	...	...	...	...	...	...	...	Immature

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinolophus mehelyi																		
FMNH 111143	Gara Tarik Cave	♀	84	31	11	21	52	...	...	...	...	...	...	...	...	...	...	Immature
111144	Gara Tarik Cave	♀	81	25	11	22	53	...	...	...	...	...	...	...	...	...	...	Immature
Rhinolophus blasii																		
	Mahallat	♂	72.5	24.7	10.7	16.4	47	...	...	...	16.9	2.3	9.3	...	6.6	...	...	Etemad, 1969, pp. F92, 94
	Mahallat	♂	72.5	23.2	9.8	15.8	42.9	...	...	...	17.0	2.3	9.5	...	6.8	...	...	Etemad, 1969, pp. F92, 94
BM 66.308	Shah Abbas Caves	♀	83	27	11	20	49.0	...	...	...	...	...	...	...	...	...	...	Alcohol
66.309	Shah Abbas Caves	♀	77	25	10	19	46.9	...	...	...	...	...	...	...	...	...	...	Alcohol
66.310	Shah Abbas Caves	♀	80	25	10	16	50.2	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 96563	Robat-i-Qarabil	♀	78	24	10.5	20	50	...	...	...	...	...	...	...	...	...	...	Skull not found
96564	Robat-i-Qarabil	♀	87	28	11	21	51	...	...	...	...	...	...	...	...	...	...	Alcohol, nipples enlarged
96565	Robat-i-Qarabil	♀	85	23	11	22	50.2	...	...	...	...	...	...	...	...	...	...	Alcohol
96566	Robat-i-Qarabil	♀	80	26	11	20	48	...	...	...	...	...	...	...	...	...	...	Skull not found
96567	Robat-i-Qarabil	♂	84	24	11	20	46	...	20.1	17.8	16.8	2.4	9.4	8.9	6.3	7.0	12.4	
96568	Robat-i-Qarabil	♀	87	31	11	21	48	...	19.5	...	...	2.3	...	8.5	6.1	6.9	11.9	
96569	Robat-i-Qarabil	♂	81	27	10	21	46	...	...	...	...	...	...	...	...	...	...	Skull not found
96570	Robat-i-Qarabil	♀	...	...	...	...	...	...	19.5	17.6	16.9	2.5	9.2	8.7	6.5	7.0	12.5	Skull only
96571	Robat-i-Qarabil	♀	88	31	10	21	47	...	...	...	16.6	2.4	9.2	8.7	6.2	...	...	
96572	Robat-i-Qarabil	♀	84	21	11	21	48	...	...	...	16.5	2.4	9.2	8.8	6.2	6.9	12.0	
96573	Robat-i-Qarabil	♂	85	24	11	21	48	...	19.7	17.6	16.5	2.3	9.2	8.7	6.3	7.0	12.2	
96574	Robat-i-Qarabil	♀	83	27	10	21	47	...	19.1	...	16.5	2.4	8.9	8.5	6.1	6.9	12.6	
96575	Shahrabad Kaur	♀	82	28	10	21	49	...	20.0	...	...	2.3	8.9	8.3	6.2	7.0	12.1	
96576	Shahrabad Kaur	♀	88	26	11	21	49	...	19.9	...	...	2.4	9.2	8.7	6.2	6.9	12.2	
96577	Shahrabad Kaur	♀	85	27	11	21	48	...	19.9	17.8	16.8	2.3	9.3	8.8	6.3	7.0	12.4	
96578	Shahrabad Kaur	♂	85	28	10	21	48	...	19.8	17.6	16.6	2.3	9.0	8.6	7.6	7.0	12.2	
96579	Shahrabad Kaur	♂	83	27	10	21	49	...	...	...	...	...	...	...	...	...	...	Skull not found
96580	Shahrabad Kaur	♂	80	28	10	20	47	...	19.9	18.6	16.8	2.4	9.3	8.6	6.4	7.0	12.3	
96581	Shahrabad Kaur	♀	78	23	10	20.5	49	...	19.7	17.6	16.4	2.3	9.2	8.6	6.3	7.1	12.4	
96582	Shahrabad Kaur	♀	86	26	11	21	48	...	19.7	17.6	16.6	2.2	9.2	8.8	6.4	6.9	12.2	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Rhinolophus blasii																		
FMNH 96583	Shahrabad Kaur	♂	85	25	10	21	47	...	19.6	17.4	16.3	2.3	...	8.7	6.0	6.9	12.4	
96584	Shahrabad Kaur	♀	93	29	11	20	47.5	...	19.6	17.5	16.9	2.4	...	8.5	6.4	7.0	12.3	
96585	Shahrabad Kaur	♀	86	27	11	21	49	...	...	...	...	...	...	...	...	...	...	
96586	Shahrabad Kaur	♂	79	27.5	11	21	48	...	...	...	...	...	...	...	...	...	...	Skull not found
96587	Shahrabad Kaur	♀	83	26	11	19	49.4	...	...	...	...	...	...	...	...	...	...	Alcohol
96588	Shahrabad Kaur	♀	80	24	10	20	49.8	...	...	...	...	...	...	...	...	...	...	Alcohol
96589	Shahrabad Kaur	♂	80	24	11	20	48.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96590	Shahrabad Kaur	♂	80	27	10	20	48.6	...	...	...	...	...	...	...	...	...	...	Alcohol
96591	Shahrabad Kaur	♂	85	28	11	20	48.4	...	...	...	...	...	...	...	...	...	...	Alcohol
96592	Shahrabad Kaur	♂	87	27	10	20	49.1	...	...	...	...	...	...	...	...	...	...	Alcohol
96593	Shahrabad Kaur	♀	73	24	11	20	48.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96594	Shahrabad Kaur	♂	79	23	10	20	48.2	...	...	...	...	...	...	...	...	...	...	Alcohol
96595	Shahrabad Kaur	♀	81	25	11	19	47.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96596	Shahrabad Kaur	♀	...	...	11	20	49.4	...	...	...	...	...	...	...	...	...	...	Alcohol
96597	Shahrabad Kaur	♂	81	26	10	20	47.6	...	...	...	...	...	...	...	...	...	...	Alcohol
96598	Shahrabad Kaur	♂	81	25	11	19	47.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96599	Shahrabad Kaur	♂	82	27	11	20	49.0	...	...	...	...	...	...	...	...	...	...	Alcohol
96600	Shahrabad Kaur	♀	83	27	10	21	49.3	...	...	...	...	...	...	...	...	...	...	Alcohol
96601	Shahrabad Kaur	♀	85	27	11	19	49.4	...	...	...	...	...	...	...	...	...	...	Alcohol
96602	Ganjah Kuh	♀	85	30	10	21	49.5	...	...	...	...	...	...	...	...	...	...	Alcohol
96603	Ganjah Kuh	♀	85	31	10	21	48	...	...	...	...	...	...	...	...	...	...	Alcohol
96604	Ganjah Kuh	♂	86	31	10	21	48	...	...	...	...	...	...	...	...	...	...	Alcohol
98371	Ganjah Kuh	♀	76	24	11	18	46.6	...	...	...	...	...	...	...	...	...	...	Alcohol
98372	Ganjah Kuh	♂	82	28	11	20	49.8	...	...	...	...	...	...	...	...	...	...	Alcohol
98373	Ganjah Kuh	♂	78	27	10	20	47.9	...	...	...	...	...	...	...	...	...	...	Alcohol
98374	Ganjah Kuh	♀	...	...	10	19	48.2	...	...	...	...	...	...	...	...	...	...	Alcohol
98375	Ganjah Kuh	♀	79	21	9	18	47.8	...	...	...	...	...	...	...	...	...	...	Alcohol
98376	Ganjah Kuh	♀	...	...	10	19	48.6	...	...	...	...	...	...	...	...	...	...	Alcohol
98377	Ganjah Kuh	♀	81	20	10	18	48.2	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Rhinolophus blasii																		
FMNH 96608	1.6 km. E Kerman	♀	73	26	9	21	46	...	19.4	17.1	16.1	2.2	8.8	8.2	6.2	7.2	12.7	
96609	1.6 km. E Kerman	♂	79	24	10	21	47	...	19.6	17.2	16.5	2.2	8.9	8.3	6.6	7.0	12.1	
96610	1.6 km. E Kerman	♂	81	28	10	21.5	46	...	19.2	16.9	16.2	2.2	9.0	8.6	6.3	7.0	12.0	
96611	1.6 km. E Kerman	♂	...	23	9	19	46.5	...	...	...	...	...	...	...	...	...	...	Skull not found
96612	1.6 km. E Kerman	♂	76	24	9	20	47	...	...	...	16.3	2.3	8.8	8.2	6.4	6.9	12.0	
96613	1.6 km. E Kerman	♀	81	28	10	20	47.1	...	...	...	...	...	...	...	...	...	...	Alcohol
IPHR 540	Chelmir	♀	...	...	...	...	48.1	...	...	...	...	...	...	...	...	...	...	Alcohol
544		♀	...	...	...	...	47.2	...	...	...	...	...	...	...	...	...	...	Alcohol
1123	8 km. NW Meher	♂	...	...	...	...	49.2	...	...	...	...	...	...	...	...	...	...	Alcohol
1124	8 km. NW Meher	♀	...	...	...	...	47.5	...	...	...	...	...	...	...	...	...	...	Alcohol
3705	137 km. SE Sabzevar	♀	...	...	...	...	45.4	...	...	...	...	...	...	...	...	...	...	Alcohol
3706	137 km. SE Sabzevar	♀	...	...	...	...	45.2	...	...	...	...	...	...	...	...	...	...	Alcohol
3707	137 km. SE Sabzevar	♀	...	...	...	...	48.0	...	...	...	...	...	...	...	...	...	...	Alcohol
3708	137 km. SE Sabzevar	♀	...	...	...	...	47.7	...	...	...	...	...	...	...	...	...	...	Alcohol
3709	137 km. SE Sabzevar	♀	...	...	...	...	46.0	...	...	...	...	...	...	...	...	...	...	Alcohol
3710	137 km. SE Sabzevar	♀	...	...	...	...	47.5	...	...	...	...	...	...	...	...	...	...	Alcohol
3711	137 km. SE Sabzevar	♀	...	...	...	...	47.0	...	...	...	...	...	...	...	...	...	...	Alcohol
4560	15 km. S, 6 km. E Yazd	♀	...	...	...	...	47.4	...	...	...	...	...	...	...	...	...	...	Alcohol
4561	15 km. S, 6 km. E Yazd	♀	...	...	...	...	45.7	...	...	...	...	...	...	...	...	...	...	Alcohol
4562	15 km. S, 6 km. E Yazd	♀	...	...	...	...	48.2	...	...	...	...	...	...	...	...	...	...	Alcohol
4563	15 km. S, 6 km. E Yazd	♀	...	...	...	...	46.4	...	...	...	...	...	...	...	...	...	...	Alcohol
USNM 327989	3 km. SW Esfideh	♀	90	35	11	20	47.7	...	...	...	...	...	...	...	...	...	...	
327990	5 km. SW Esfideh	♂	88	33	10	20	48.6	...	...	...	...	...	...	...	...	...	...	
SMF 46686	Mozduran	♀	81	30	8	21	48	...	19.4	17.2	...	...	9.2	...	6.8	...	...	Felten, pers. comm., 1975
47842	Tabriz	♀?	...	...	...	...	47.5	...	...	...	...	...	9.4	...	6.8	...	...	Felten, pers. comm., 1975
FMNH 111605	Maku	?	...	...	...	...	...	...	...	...	16.8	2.3	9.3	8.5	6.1	6.9	12.0	Skull & skeleton
111169	Canae Gabru Cave	♂	92	31	11	21	48	...	19.7	17.4	16.2	2.3	9.2	8.7	6.8	7.0	12.3	
111174	Canae Gabru Cave	♂	94	32	11	20	48	...	19.9	17.5	16.4	2.3	9.4	8.8	6.2	7.1	12.2	
111178	Canae Gabru Cave	♂	92	31	11	20	48	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Rhinolophus blasii																		
FMNH 111180	Canae Gabru Cave	♂	88	31	11	20	49.0	...	...	...	...	...	...	...	...	...	...	Alcohol
111182	Canae Gabru Cave	♂	88	...	11	19	47.8	...	...	...	...	...	...	...	...	...	...	Alcohol
IPHR uncat.		♂	78	28	7	17	46.8	...	...	...	16.5	2.6	9.2	9.1	6.4	7.2	12.3	
uncat.		♀	76	23	9	17	46.5	...	...	16.6	16.0	2.8	8.8	8.8	6.2	6.9	12.1	Teats enlarged, pregnant
BM 85.8.1.112	Mekran Coast	?	...	...	9	...	45.2	...	...	...	...	...	...	...	...	...	...	May be from Pakistan
Asellia tridens																		
BM 79.8.15.1	Bushehr	♂	...	23	9	19	52.4	...	...	...	...	2.2	10.3	8.7	6.8	7.4	12.9	Alcohol
	Dezful	♀	74.8	25.1	8.1	15.3	51.2	...	...	...	12.7	2.4	10.6	...	6.7	...	...	Etemad, 1969, pp. F98, 99
	Kazerun	?	75.4	23	8.7	16	51.9	...	...	...	12.7	2.4	10.3	...	6.8	...	...	Etemad, 1969, pp. F98, 99
	Rudan	♀	77.5	23.6	9	17.2	52.1	...	...	...	12.3	2.2	9.8	...	6.4	...	...	Etemad, 1969, pp. F98, 99
FMNH 94378	Rabatak	♀	...	...	...	...	50.8	...	...	...	...	...	...	...	...	...	...	Mummified
94379	Rabatak	♀	...	...	...	...	50.4	...	...	...	...	...	...	...	...	...	...	Mummified
94380	Rabatak	♀	...	...	...	...	48.7	...	...	...	...	...	...	...	...	...	...	Mummified
94381	Rabatak	♀	...	...	...	...	50.3	...	...	...	...	...	...	...	...	...	...	Mummified
94382	Rabatak	♀	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Mummified
94383	Rabatak	♀	...	...	...	...	50.4	...	...	...	...	...	...	...	...	...	...	Mummified
94384	Rabatak	♀	...	...	...	...	51.4	...	...	...	...	...	...	...	...	...	...	Mummified
94385	Rabatak	♀	...	...	...	...	51.4	...	...	...	...	...	...	...	...	...	...	Mummified
98386	Jahrom	♀	...	...	...	...	50.8	...	...	...	...	...	...	...	...	...	...	Mummified
98387	Jahrom	♀	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Mummified
98388	Jahrom	♀	...	...	...	...	52.8	...	...	...	...	...	...	...	...	...	...	Mummified
98389	Jahrom	?	...	...	...	...	...	...	...	16.8	...	2.3	...	7.6	6.8	...	12.5	Skull only
98390	Jahrom	?	...	...	...	...	...	...	18.8	17.2	16.1	2.3	10.7	7.1	6.2	7.4	13.2	Skull only
98391	Jahrom	?	...	...	...	...	...	...	18.3	16.7	15.9	2.3	10.0	7.6	6.2	7.3	12.5	Skull only
98392	Jahrom	?	...	...	...	...	...	...	18.4	16.7	16.0	2.3	...	7.5	6.5	7.5	12.7	Skull only
BM 6.1.2.1	Seistan	?	...	23	8	18	48.7	...	...	...	...	...	...	...	...	...	...	Alcohol, skull not found; could be from Afghanistan
BM 85.8.1.368	Mekran Coast	♂	...	...	...	...	51.0	...	...	...	...	2.4	...	...	6.9	7.5	...	Could be from Pakistan

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Asellia tridens																		
USNM 350142	10 km. SE Kazerun	♀	80	22	9	20	48.2	...	...	...	...	...	...	...	...	...	...	
FMNH 111233	Mehran	♂	...	...	...	...	53	...	...	...	...	...	...	...	...	...	...	Mummified
111226	Dehloran	♂	91	27	10	17	50	...	19.2	17.4	16.0	2.4	10.6	7.8	6.2	7.7	13.2	
111227	Dehloran	♂	90	24	10	17	50	...	...	...	...	...	...	...	...	...	...	Alcohol
111228	Dehloran	♂	87	25	10	16	50	...	18.9	17.2	15.9	2.3	10.5	7.7	6.3	7.5	12.7	
111229	Dehloran	♀	75	23	9	16	49	...	18.0	16.3	15.4	2.3	...	7.5	5.9	7.4	...	
111230	Dehloran	♂	84	21	9	17	50	...	...	...	15.7	2.4	11.0	7.9	6.1	7.6	13.1	
111231	Dehloran	♂	76	22	9	16	49	...	18.3	16.6	15.5	2.3	10.4	7.8	6.0	7.3	12.1	
111232	Dehloran	♀	84	23	9	17	50	...	...	...	...	...	...	...	...	...	...	Alcohol
IPHR uncat.	Chah Bahar	♂	77	28	8.0	19	51.5	...	...	...	15.8	2.3	10.0	8.4	6.3	7.4	12.4	
uncat.	Chah Bahar	♂	67	29	9.1	18	52.0	...	...	...	...	...	...	...	...	...	...	
uncat.	Kazerun	♂	...	...	9.1	...	46.8	...	...	...	...	...	...	...	...	...	...	Prevolant, skin only
MMTT uncat.	Dehloran	♀	86	28	9	21	54	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #1
uncat.	Dehloran	♀	85	25	9	20	50	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #2, 1 embryo
uncat.	Dehloran	♀	85	21	10	22	53	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #3
uncat.	Dehloran	♀	88	30	10	21	52	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #4
uncat.	Dehloran	♀	83	26	9	21	48	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #5
uncat.	Dehloran	♀	...	...	10	21	54	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #6
uncat.	Dehloran	♀	87	24	10	20	52	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #7
uncat.	Dehloran	♂	58	14	10	12	28	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #8, immature
uncat.	Dehloran	♂	59	14	9	14	35	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #9, immature
uncat.	Dehloran	♂	51	13	9	11	23	...	...	...	...	...	...	...	...	...	...	Lay, 1974, pers. comm. #10, immature
Triaenops persicus																		
BM 76.3.10.3	Shiraz	?	...	...	9	12	51.6	...	18.9	16.5	...	2.6	8.7	8.5	6.6	7.2	11.8	Cotype, alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Triaenops persicus																		
BM 97.11.10.1	Bushehr	?	...	32	10	14	53.0	...	...	...	...	2.7	9.2	9.1	7.1	7.5	12.8	Alcohol
FMNH 96669	Ahram	♀	93	31	10	16	52	...	19.3	17.0	...	2.7	8.7	7.6	6.3	7.0	12.2	
96670	Ahram	♂	87	36	9	15	53	...	...	...	...	...	...	...	...	...	...	Alcohol
96671	Ahram	♂	89	31	10	16	52	...	20.0	17.8	...	2.6	9.0	7.8	6.4	7.1	12.3	
96672	Ahram	♀	93	36	9	15	51	...	19.8	17.3	...	2.6	8.7	7.7	6.2	7.0	12.2	
96673	Ahram	♂	97	39	11	16	54	...	...	...	...	...	...	...	...	...	...	
96674	Ahram	♂	93	33	10	16	51	...	...	...	...	2.5	...	...	6.5	7.5	12.6	
96675	Ahram	♂	93	33	10	16	52	...	20.5	18.2	...	2.6	9.1	7.8	6.5	7.7	12.9	
96676	Ahram	♂	95	32	10	15	54	...	19.9	17.7	...	2.9	9.2	7.8	6.2	7.4	12.5	
96678	Ahram	♀	88	31	9	16	53	...	19.1	16.9	...	2.7	8.7	7.8	6.1	7.0	11.7	
96679	Ahram	♂	97	33	10	16	54	...	21.4	18.9	...	3.0	9.5	8.2	6.4	7.7	13.1	
96680	Ahram	♂	94	39	10	16	55	...	21.3	18.6	...	2.8	9.2	8.1	6.6	7.7	13.0	
96681	Ahram	♂	90	35	8	13	51	...	...	...	...	...	...	...	...	...	...	Alcohol
96682	Ahram	♀	89	33	9	13	51	...	...	...	...	...	...	...	...	...	...	Alcohol
96683	Ahram	♀	89	31	9	13	52	...	...	...	...	...	...	...	...	...	...	Alcohol
96684	Ahram	♀	90	34	9	14	51	...	...	...	...	...	...	...	...	...	...	Alcohol
USNM 327982	Nikshahr	♀	93	36	10	13	49.5	...	...	...	...	...	...	...	...	...	...	
327983	Nikshahr	♀	91	34	10	13	50.2	...	...	...	...	...	...	...	...	...	...	
327984	Nikshahr	♂	94	33	11	14	51.1	...	...	...	...	...	...	...	...	...	...	
327985	Nikshahr	♀	90	31	10	13	48.3	...	...	...	...	...	...	...	...	...	...	
327986	Nikshahr	♀	86	32	10	13	48.5	...	...	...	...	...	...	...	...	...	...	
327987	Nikshahr	♂	93	34	10	14	52.4	...	...	...	...	...	...	...	...	...	...	
327988	Nikshahr	♀	91	33	10	13	49.5	...	...	...	...	...	...	...	...	...	...	
Myotis mystacinus																		
BM 36.1196	Kutur Su	♂	...	39	9	16	36.5	...	14.9	14.2	...	3.8	...	7.3	5.5	6.1	10.2	Alcohol
36.1197	Kutur Su	♂	...	38	8	16	36.1	9	14.2	14.0	...	3.9	...	7.7	5.6	6.0	11.1	Alcohol
36.1198	Kutur Su	♂	...	40	8	17	36.0	10	14.2	...	...	3.8	...	7.4	5.4	5.7	10.5	Alcohol
FMNH 96428	8 km. N Gorgan	♂	76	36	8	14	33	...	...	...	...	...	...	...	...	...	...	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Myotis mystacinus																		
FMNH 96436	Sama	♀	78	39	8.2	14.5	34.4	...	13.2	11.9	...	3.4	...	6.4	4.7	4.9	9.2	
96439	2 km. W Maku	♀	84	40	9	14	35	7	...	...	...	...	...	...	...	...	...	Alcohol
96437	10 km. SW Rezaiyeh	♂	86	45	8	15	35	...	13.8	13.1	...	3.4	8.1	6.5	5.1	5.3	9.7	
96438	18 km. SW Rezaiyeh	♀	80	41	9	15	37	...	13.7	13.2	...	3.2	8.3	6.6	5.0	5.4	10.2	
IPHR 63	15 km. W Chalus	♀	88	37	9	14	35.7	...	...	...	...	...	...	...	...	...	...	Lactating, skull not found
89	Siahkal	...	89	34	8	15.5	36.5	...	...	...	...	...	...	...	...	...	...	Skull not found
FMNH 111236	6.4 km. N Kermanshah	♀	91	40	8	15	35	10	13.9	13.1	...	3.3	8.3	6.7	5.0	5.3	10.2	
111237	8 km. N Kermanshah	♂	85	40	8	13	35	8	14.2	13.2	...	3.2	8.0	6.5	5.1	5.4	10.0	
111234	8 km. N Kermanshah	♀	80	36	9	12	35	8	...	...	...	...	...	...	...	...	...	Alcohol
SMNS 4056	Tehran	♂	79	35	7.6	12	34.4	...	12.9	12.1	...	3.1	...	6.3	4.8	5.0	8.9	Immature
Myotis emarginatus																		
BM 9.1.4.33	Jalq	♀	...	40	11	16	42.0	10	16.6	15.2	...	3.6	10.0	8.1	6.7	7.2	12.5	Alcohol, Co-type of *desertorum*
47.11.21.29	Jalq	♀	93	42	11	14	45.7	10	...	...	...	...	...	...	...	...	...	Alcohol, Co-type of *desertorum*, skull not extracted
47.11.21.30	Jalq	♀	...	40	11	14	42.6	9	16.9	15.7	...	3.8	9.8	7.9	7.2	7.2	12.6	Alcohol, Co-type of *desertorum*
19.11.8.2	Shaustun	♀	76.8	26.5	10.6	18.6	43.5	7	16.5	...	...	3.6	10.0	8.2	6.6	7.1	12.2	TL to E converted from inches. Holotype of *lanaceus*
27.10.26.2	Babol	♂	60	25	8.9	...	37.2	...	...	...	...	...	...	...	...	...	...	
27.10.26.3	Babol	♀	...	...	9.2	...	42.2	...	...	...	...	...	...	...	...	...	...	
27.10.26.4	Babol	?	87	40	10	13	40.4	...	...	...	...	...	...	...	...	...	...	
	Mahallat	♀	84.8	39.8	10	10.7	41.7	...	16.8	...	14.6	3.6	9.5	...	6.5	...	...	Etemad, 1969, p. F120
	Babol	♂	88.7	41.9	9	12.6	42.2	...	...	...	...	3.7	...	...	...	...	...	Etemad, 1969, p. F120
	Konar-Takhteh	♀	89.8	39.8	10.8	14.2	42.5	...	16.5	...	14.6	3.8	9.8	...	6.6	...	...	Etemad, 1969, p. F120
IPHR 712	Chelmir	♂	73	32	10	9	37.2	6	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Myotis emarginatus																		
IPHR uncat.	Chelmir	?	...	...	9.3	...	39.3	...	...	...	...	...	...	...	...	...	...	A232, skin only, immature
uncat.	Chelmir	♀	...	...	...	...	...	...	16.5	15.0	...	3.9	...	8.0	6.3	6.7	12.3	A333, skull only
FMNH 111238	57 km. W Shahabad	♂	94	39	10	17	40	9	...	...	...	...	...	...	...	...	...	Alcohol
111239	57 km. W Shahabad	♀	94	48	9	16	40	9	16.2	15.1	...	3.8	9.6	7.5	6.3	6.7	12.1	
IPHR uncat.	Kazerun	♀	82	38	9	17	40.6	...	15.9	14.8	...	3.8	...	7.8	6.3	6.6	11.9	
MMTT uncat.	Tir Tash	♂	88	39	11	16	39.4	8.5	...	...	...	...	...	...	...	...	...	Alcohol
uncat.	Tir Tash	♀	89	39	11	17	42.6	9	...	...	...	...	...	...	...	...	...	Alcohol
Myotis nattereri																		
BM 63.1194	Kutur Su	♂	...	42	11	18	43.3	11	17.4	15.8	...	4.2	...	8.3	6.6	6.9	12.7	Alcohol
63.1195	Kutur Su	?	...	...	...	...	42.8	...	17.9	16.5	...	4.3	10.8	9.0	6.8	7.5	13.5	Alcohol
FMNH 111606	Maku	♂	90	41	11	20	43	12	...	...	...	4.1	...	8.3	6.8	6.6	...	
111235	Kuh Rang	♀	92	40	11	17	42	11	...	16.2	...	3.9	10.0	7.9	6.7	7.0	12.4	
Myotis bechsteini																		
UMM 118405	M.R.S. Nat. Pk.	♀	96	42	14	26	45	...	17.9	16.4	15.3	4.1	10.3	...	7.0	7.5	13.5	
Myotis blythi																		
BM 5.10.4.14	Darband	♂	136	61	13.5	26	59.3	...	22.7	21.6	...	5.4	14.8	10.3	9.2	10.1	18.3	Holotype of *omari*
5.10.4.15	Darband	♂	...	...	14	22	58.9	...	...	21.0	...	5.5	14.6	10.4	8.7	9.6	17.5	
2.10.1.5	nr. Telespid	♀	130.5	58.5	14	24	60.4	...	22.6	21.0	...	5.1	14.1	10.2	9.0	9.8	17.8	
7.7.14.5	nr. Rasht	♂	143	68	14	24.5	60.1	...	23.3	21.7	...	5.3	14.5	10.1	9.3	10.2	18.2	
7.7.14.6	nr. Rasht	♀	139	64	13.5	25	58.5	...	...	...	...	5.1	...	...	9.2	9.8	17.8	
20.2.9.18	Shiraz	♂	138	62	14	26	61.3	...	23.2	21.2	...	5.3	...	10.4	9.0	10.1	17.7	Holotype of *risorius*
20.2.9.19	Shiraz	♀	129	56	15	25	63.8	...	22.9	21.3	...	5.2	14.6	10.5	9.0	9.8	18.1	
BM 25.10.4.5	Shiraz	♂	125	60	14	23	61.3	...	23.4	22.0	...	5.0	14.4	10.3	9.2	10.0	18.3	
25.10.4.6	Shiraz	♂	126	60	14	23	58.8	...	22.8	21.2	...	5.1	14.3	10.2	9.1	10.0	18.0	
25.10.4.7	Shiraz	♀	128	58	14	22	62.7	...	22.6	21.3	...	5.1	...	10.2	9.1	10.0	17.8	
25.10.4.8	Shiraz	♀	133	59	15	25	62.8	...	22.9	21.2	...	5.2	14.3	10.4	9.1	10.2	17.7	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Myotis blythi																		
BM 25.10.4.9	Shiraz	♀	132	60	15	24	63.5	...	22.9	21.5	...	5.1	...	9.9	9.3	10.0	18.3	
63.1193	Kutur Su	?	...	...	15	20	65.1	9	22.1	20.5	...	5.1	...	9.6	9.0	9.8	17.6	Alcohol
66.3215	Jangeh	♂	119	53	15	20	59.9	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3216	Jangeh	♂	130	55	14	24	61.2	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3217	Jangeh	♀	131	56	15	23	60.7	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3218	Jangeh	♂	130	55	15	23	60.0	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3219	Jangeh	♂	128	59	16	23	58.3	10	...	...	...	...	...	...	...	...	...	Alcohol
66.3220	Jangeh	♀	125	56	16	20	60.3	10	...	...	...	...	...	...	...	...	...	Alcohol
66.3221	Jangeh	♂	118	56	16	21	57.6	10	...	...	...	...	...	...	...	...	...	Alcohol
66.3222	Jangeh	♂	133	60	16	21	60.0	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3223	Jangeh	♂	133	57	15	23	52.3	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3224	Jangeh	♂	126	55	15	23	59.4	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3225	Jangeh	♂	136	62	17	23	64.0	11	...	...	...	...	...	...	...	...	...	Alcohol
66.3226	Jangeh	♂	135	60	15	23	59.9	11	...	...	...	...	...	...	...	...	...	Alcohol
HZM 12.3743	105 km. E Tehran	♀	120.5	58.7	12.5	20.3	59.0	...	22.5	21.3	...	5.1	13.5	10.2	8.8	10.0	17.0	
13.3744	105 km. E Tehran	♀	129.6	57.8	13.6	20.8	61.1	...	22.7	21.0	...	5.2	...	10.6	9.2	10.2	17.6	
14.3745	105 km. E Tehran	♀	117.4	56.7	13	20	57.9	...	22.7	21.3	...	5.3	14.2	10.3	9.3	9.7	17.4	
15.3746	105 km. E Tehran	...	129.3	57.0	12.9	19.2	58.0	...	22.6	21.5	...	5.3	...	10.6	9.0	10.1	17.4	
16.3747	105 km. E Tehran	?	126	57.9	12.5	19.0	60.2	...	22.8	22.2	...	5.0	13.4	10.5	9.3	10.3	17.9	
17.3748	105 km. E Tehran	♀	122.8	53.1	12.8	20.3	61.1	...	23.0	21.5	...	5.2	...	10.4	8.4	10.9	17.0	
	105 km. E Tehran	♀	128.9	62.5	14.1	22.3	58.9	...	...	...	20.3	5.3	14.3	...	9.2	...	...	Etemad, 1969, p. F129
	105 km. E Tehran	♀	127.0	61.1	13.7	19.0	61.5	...	...	...	21.1	5.1	14.0	...	9.4	...	...	Etemad, 1969, p. F129
FMNH 96685	4 km. W Maku	♀	124	59	14	22	60	...	22.6	21.3	...	5.3	14.5	9.9	9.0	10.2	17.3	
96720	33 km. SE Rezaiyeh	♀	140	63	16	25	58	...	22.8	21.3	...	5.5	14.8	10.0	9.2	10.0	17.3	
	Mahallat	♀	132.0	58.8	12.5	19.8	61.3	...	...	...	20.5	5.0	...	...	9.3	...	...	Etemad, 1969, p. F129
IPHR uncat.	Chelmir	♂	127	59	13	...	56.9	...	21.6	20.6	...	4.8	13.5	10.0	8.7	9.5	16.9	
uncat.	Chelmir	♀	121	53	15	20	61.8	...	21.3	20.4	...	5.1	...	10.2	8.5	9.5	17.2	
830	20 km. W Mashhad	?	...	...	...	...	59.4	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Myotis blythi																		
IPHR 834	20 km. W Mashhad	♂	...	...	...	...	58.8	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 111333	Gara Tarik	♂	137	57	13	24	61	13	23.2	21.9	...	5.3	14.5	10.4	9.2	10.0	17.6	
111334	Gara Tarik	♂	130	58	12	24	58	11	22.5	21.3	...	5.2	...	9.8	9.1	10.0	17.4	
111335	Gara Tarik	♂	136	59	14	22	62	11	22.3	21.5	...	5.5	14.0	9.8	9.0	9.8	17.5	
111336	Gara Tarik	♀	135	56	14	22	64	10	22.8	21.6	...	5.4	...	10.4	8.9	9.8	...	
111337	Gara Tarik	♀	127	58	12	23	63	11	...	...	...	...	...	...	...	...	...	
111338	Gara Tarik	♀	142	64	14	23	62	12	...	...	...	...	...	...	...	...	...	
111339	Gara Tarik	♀	133	58	15	24	59	11	...	...	...	...	...	...	...	...	...	
111340	Gara Tarik	♀	135	65	13	24	61	11	...	...	...	...	...	...	...	...	...	Alcohol
111341	Gara Tarik	♀	136	61	12	24	63	12	...	...	...	...	...	...	...	...	...	Alcohol
111342	Gara Tarik	♀	145	63	15	24	68	12	...	...	...	...	...	...	...	...	...	Alcohol
111343	Gara Tarik	♂	130	55	12	23	59	12	...	...	...	...	...	...	...	...	...	Alcohol
111344	Gara Tarik	♂	138	58	15	24	62	12	...	...	...	...	...	...	...	...	...	Alcohol
111345	Gara Tarik	♂	129	59	11	21	59	12	...	...	...	...	...	...	...	...	...	
111346	Karaftu	♂	127	56	16	23	61	...	...	...	...	...	...	...	...	...	...	
111347	Karaftu	♂	133	58	16	24	62	...	...	...	...	...	...	...	...	...	...	
111348	Karaftu	♀	137	62	16	24	62	...	22.7	21.7	...	5.1	14.5	10.1	8.9	10.0	17.5	
111349	Karaftu	♂	131	56	16	25	65	...	...	...	...	...	...	...	...	...	...	Alcohol
111350	Karaftu	♀	129	54	15	22	62	12	...	...	...	...	...	...	...	...	...	Alcohol
111351	Karaftu	♂	128	55	15	22	61	12	23.1	22.0	...	5.1	14.5	9.6	8.9	9.9	17.6	
111352	Karaftu	♂	130	58	16	23	60	12	...	...	...	...	...	...	...	...	...	Alcohol
111251	Korie Cowat	♂	129	60	14	...	60	10	23.4	21.9	...	5.5	14.4	10.1	9.2	9.8	17.5	
111252	Korie Cowat	♀	134	62	14	...	64	11	23.1	21.0	...	5.2	14.1	9.9	8.8	9.8	17.3	
111253	Korie Cowat	♂	124	56	14	23	60	11	22.9	21.4	...	5.2	...	9.6	9.0	10.0	17.5	
111254	Korie Cowat	♀	126	58	14	26	64	12	...	...	...	...	...	...	...	...	...	
111255	Korie Cowat	♀	131	60	16	...	65	11	...	...	...	...	...	...	...	...	...	
111256	Korie Cowat	♂	132	57	13	...	59	11	...	...	...	...	...	...	...	...	...	
111257	Korie Cowat	♂	131	60	15	...	63	11	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Myotis blythi																		
FMNH 111258	Korie Cowat	♂	138	59	16	23	60	11	...	...	...	...	...	...	...	...	...	Alcohol
111259	Korie Cowat	♂	135	60	15	23	61	11	...	...	...	...	...	...	...	...	...	Alcohol
111260	Korie Cowat	♀	134	57	16	...	62	11	...	...	...	...	...	...	...	...	...	Alcohol
111261	Korie Cowat	♀	135	60	14	22	60	11	...	...	...	...	...	...	...	...	...	Alcohol
111262	Korie Cowat	♂	139	60	16	...	62	11	...	...	...	...	...	...	...	...	...	Alcohol
111263	Korie Cowat	♂	132	60	15	24	60	11	...	...	...	...	...	...	...	...	...	Alcohol
111264	Korie Cowat	♂	141	57	14	...	60	11	...	...	...	...	...	...	...	...	...	Alcohol
111265	Korie Cowat	♂	140	61	13	24	63	11	...	...	...	...	...	...	...	...	...	Alcohol
111266	Korie Cowat	♂	134	61	14	...	62	11	...	...	...	...	...	...	...	...	...	
111267	Korie Cowat	♂	137	61	14	24	61	11	...	...	...	...	...	...	...	...	...	
111268	Korie Cowat	♀	138	60	...	25	62	10	...	...	...	...	...	...	...	...	...	
111269	Korie Cowat	♀	131	55	15	24	61	10	...	...	...	...	...	...	...	...	...	
111270	Korie Cowat	♀	134	60	15	24	63	10	...	...	...	...	...	...	...	...	...	Alcohol
111271	Korie Cowat	♂	136	60	14	24	61	10	...	...	...	...	...	...	...	...	...	Alcohol
111272	Korie Cowat	♀	136	61	16	24	65	10	...	...	...	...	...	...	...	...	...	Alcohol
111273	Korie Cowat	♀	123	54	16	25	60	9	...	...	...	...	...	...	...	...	...	Alcohol
111274	Korie Cowat	♂	141	57	15	24	58	10	...	...	...	...	...	...	...	...	...	Alcohol
111275	Korie Cowat	♂	138	58	14	24	59	9	...	...	...	...	...	...	...	...	...	Alcohol
111276	Korie Cowat	♂	140	61	16	24	62	10	...	...	...	...	...	...	...	...	...	Alcohol
111277	Porcupine Cave	♂	135	55	12	25	61	11	23.7	22.0	...	5.1	15.1	10.5	9.3	10.1	17.6	
111278	Porcupine Cave	♀	135	57	11	25	65	11	22.9	21.7	...	5.1	14.2	9.6	8.9	9.9	17.2	
111279	Porcupine Cave	♀	133	55	13	22	60	11	...	...	...	...	...	...	...	...	...	
111280	Porcupine Cave	♀	131	55	11	23	57	10	...	...	...	...	...	...	...	...	...	
111281	Porcupine Cave	♂	135	57	11	22	57	11	22.5	...	...	5.0	13.8	9.5	9.1	9.9	17.1	
111282	Porcupine Cave	♂	133	56	12	25	60	12	...	...	...	...	...	...	...	...	...	
111283	Porcupine Cave	♀	132	56	12	22	57	10	...	...	...	...	...	...	...	...	...	Alcohol
111284	Porcupine Cave	♂	131	52	14	22	60	11	...	...	...	...	...	...	...	...	...	Alcohol
111285	Porcupine Cave	♂	136	55	14	23	58	11	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Myotis blythi																		
FMNH 111286	Porcupine Cave	♂	126	52	13	22	57	10	...	...	...	...	...	...	...	...	...	Alcohol
111287	Porcupine Cave	♂	130	53	14	22	58	12	...	...	...	...	...	...	...	...	...	Alcohol
111288	Porcupine Cave	♂	132	51	11	24	60	12	...	...	...	...	...	...	...	...	...	Alcohol
111289	Porcupine Cave	♂	135	55	14	22	57	13	...	...	...	...	...	...	...	...	...	Alcohol
111290	Porcupine Cave	♂	130	55	14	22	58	10	...	...	...	...	...	...	...	...	...	Alcohol
111291	Porcupine Cave	♀	132	55	13	25	62	13	...	...	...	...	...	...	...	...	...	Alcohol
111292	Porcupine Cave	♀	137	62	14	25	61	11	...	...	...	...	...	...	...	...	...	Alcohol
111293	Porcupine Cave	♀	132	62	13	25	59	11	...	...	...	...	...	...	...	...	...	Alcohol
111294	Porcupine Cave	♂	133	60	14	24	58	12	...	...	...	...	...	...	...	...	...	Alcohol
111295	Porcupine Cave	♂	...	...	13	23	60	12	...	...	...	...	...	...	...	...	...	Alcohol
111296	Porcupine Cave	♂	138	56	15	24	60	12	...	...	...	...	...	...	...	...	...	Alcohol
111297	Porcupine Cave	♂	128	59	12	22	58	11	...	...	...	...	...	...	...	...	...	Alcohol
SMF 46689	Mozduran	?	...	...	...	...	...	...	20.9	20.0	...	...	...	...	8.7	...	...	"juvenile", Felten, pers. comm., 1975
FMNH 111306	Maku	♀	131	56	16	24	59	10	22.4	21.3	...	5.1	14.0	9.5	9.2	9.9	17.3	
111307	33 km. SSE Rezaiyeh	♂	141	58	15	24	60	12	...	...	...	...	...	...	...	...	...	Alcohol
111308	33 km. SSE Rezaiyeh	♂	134	54	15	22	61	12	...	...	...	...	...	...	...	...	...	Alcohol
111309	33 km. SSE Rezaiyeh	♂	141	58	16	25	61	12	...	...	...	...	...	...	...	...	...	Alcohol
111310	33 km. SSE Rezaiyeh	♂	139	62	16	23	60	12	...	...	...	...	...	...	...	...	...	Alcohol
111311	33 km. SSE Rezaiyeh	♂	139	67	14	21	60	11	...	...	...	...	...	...	...	...	...	Alcohol
111312	33 km. SSE Rezaiyeh	♂	137	58	13	22	58	11	22.9	21.7	...	5.5	14.4	9.8	9.1	10.1	17.5	
111313	33 km. SSE Rezaiyeh	♂	140	61	15	23	60	12	22.5	21.2	...	5.1	14.3	9.5	8.8	9.6	...	
111314	33 km. SSE Rezaiyeh	♂	138	59	12	24	58	13	...	...	...	...	...	...	...	...	...	Alcohol
111315	33 km. SSE Rezaiyeh	♂	143	60	15	24	57	11	...	...	...	...	...	...	...	...	...	
111316	33 km. SSE Rezaiyeh	♂	132	54	14	23	62	11	...	...	...	...	...	...	...	...	...	
111317	33 km. SSE Rezaiyeh	♂	130	55	15	25	58	11	...	...	...	...	...	...	...	...	...	Alcohol
111318	33 km. SSE Rezaiyeh	♂	134	55	15	23	59	13	...	...	...	...	...	...	...	...	...	Alcohol
111319	33 km. SSE Rezaiyeh	♂	124	56	14	23	59	12	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Myotis blythi																		
FMNH 111320	33 km. SSE Rezaiyeh	♂	140	59	15	23	62	11	...	...	...	...	...	...	...	...	...	Alcohol
111321	33 km. SSE Rezaiyeh	♂	143	61	16	24	61	12	...	...	...	...	...	...	...	...	...	Alcohol
111322	33 km. SSE Rezaiyeh	♂	141	56	15	24	60	12	...	...	...	...	...	...	...	...	...	
111247	16 km. NNW Rezaiyeh	♂	131	59	14	27	...	10	...	...	...	...	...	...	...	...	...	
57910	Sanandaj	?	...	...	...	...	...	...	22.6	21.1	...	5.1	14.3	9.8	8.9	9.9	...	Skull & skeleton
57911	Sanandaj	?	...	...	...	...	...	...	23.1	21.5	...	5.4	14.6	9.8	9.0	10.0	17.7	Skull & skeleton
57912	Sanandaj	?	...	...	...	...	...	...	23.1	22.0	...	5.2	14.3	9.8	9.2	10.2	17.9	Skull & skeleton
111248	Sanandaj	♀	131	58	16	28	...	11	...	...	...	...	...	...	...	...	...	
111249	Sanandaj	♀	137	67	16	27	62	10	22.6	21.9	...	5.4	...	10.1	8.9	9.9	18.0	
111250	Sanandaj	♂	131	60	16	29	61	11	...	22.4	...	5.4	14.5	10.0	9.4	10.1	17.7	
111323	Sanandaj	♂	136	60	11	23	59	11	22.6	21.5	...	5.2	14.2	9.8	8.8	9.9	17.1	
111324	Sanandaj	♀	139	63	15	23	63	11	23.3	21.9	...	5.1	14.7	10.0	9.1	10.2	18.0	
111325	Sanandaj	♂	116	51	15	23	60	11	22.5	21.3	...	5.3	...	9.6	8.9	9.7	17.3	
111326	Sanandaj	♂	129	57	14	22	...	12	...	...	...	...	...	...	...	...	...	
111327	Sanandaj	♂	130	57	13	23	59	13	...	...	...	...	...	...	...	...	...	Alcohol
111328	Sanandaj	♂	135	59	13	23	62	12	...	...	...	...	...	...	...	...	...	
111329	Sanandaj	♂	133	55	13	23	59	11	...	...	...	...	...	...	...	...	...	
111330	Sanandaj	♂	143	58	13	23	61	12	...	...	...	...	...	...	...	...	...	Alcohol
111331	Sanandaj	♀	131	60	16	23	64	13	...	...	...	...	...	...	...	...	...	Alcohol
111332	Sanandaj	?	...	...	14	21	56	12	...	...	...	...	...	...	...	...	...	
111298	N edge Khurramabad	?	...	...	...	...	...	...	21.9	21.0	...	5.5	14.6	9.8	9.0	9.7	...	Prevolant, skull only
111299	N edge Khurramabad	?	...	...	...	...	62	...	...	...	...	...	...	...	...	...	...	Prevolant, mummified
111300	N edge Khurramabad	♀	...	...	15	15	48	...	...	...	...	...	...	...	...	...	...	Prevolant, mummified
111301	3.2 km. NW Khurramabad	♂	133	57	14	24	60	9	22.9	21.4	...	5.3	14.2	9.9	9.4	10.1	17.7	
111302	3.2 km. NW Khurramabad	♂	130	53	13	24	60	11	22.9	21.4	...	5.2	14.3	9.8	9.2	10.1	17.7	
111303	3.2 km. NW Khurramabad	♂	133	57	13	24	61	12	...	...	...	...	...	...	...	...	...	
111304	3.2 km. NW Khurramabad	♂	133	59	15	25	60	12	...	...	...	...	...	...	...	...	...	Alcohol
111305	3.2 km. NW Khurramabad	♂	134	60	14	23	61	11	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Myotis blythi																		
FMNH 111356	3.2 km. NW Khurramabad	♂	133	51	15	23	59	11	22.5	21.7	...	5.2	14.4	10.1	9.0	10.0	17.5	
111357	3.2 km. NW Khurramabad	♂	136	61	15	24	61	12	23.0	21.6	...	5.1	14.1	9.7	9.1	10.1	17.5	
111358	3.2 km. NW Khurramabad	♂	133	57	13	24	61	12	22.7	21.3	...	5.1	14.0	9.5	9.1	9.7	17.0	
111359	3.2 km. NW Khurramabad	♂	135	58	15	23	57	11	...	...	...	...	...	...	...	...	...	Alcohol
111360	3.2 km. NW Khurramabad	♂	140	62	14	24	62	12	...	...	...	...	...	...	...	...	...	
111361	3.2 km. NW Khurramabad	♂	138	60	14	24	59	11	...	...	...	...	...	...	...	...	...	
111362	3.2 km. NW Khurramabad	♂	134	55	12	24	61	12	...	...	...	...	...	...	...	...	...	Alcohol
111363	3.2 km. NW Khurramabad	♂	141	62	14	25	61	12	...	...	...	...	...	...	...	...	...	Alcohol
111364	3.2 km. NW Khurramabad	♂	141	61	15	23	61	12	...	...	...	...	...	...	...	...	...	Alcohol
111365	3.2 km. NW Khurramabad	♂	143	62	14	24	64	11	...	...	...	...	...	...	...	...	...	Alcohol
111366	3.2 km. NW Khurramabad	♂	132	56	14	22	58	11	...	...	...	...	...	...	...	...	...	Alcohol
UMM 117564	36 km. NE Bijar	♂	126	57	17	24	60	10	...	...	...	...	...	...	...	...	...	Alcohol
117565	36 km. NE Bijar	♂	124	54	16	23	57	11	...	...	...	...	...	...	...	...	...	Alcohol
117566	36 km. NE Bijar	♂	128	57	18	25	59	10	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 82723	Shiraz	♀	117	52	15.5	22	54.5	...	21.4	20.5	...	5.0	...	9.9	8.7	9.6	16.4	
Myotis capaccinii																		
FMNH 96686	Pol-i-Abgineh	♂	86	40	...	15	41	...	...	...	...	...	...	...	...	...	...	
96687	Pol-i-Abgineh	♂	87	39	12	14	41	...	...	...	...	...	...	...	...	...	...	
96688	Pol-i-Abgineh	♂	88	40	12	15	42	...	...	...	...	...	...	...	...	...	...	
96689	Pol-i-Abgineh	♂	92	39	12	15	41	...	...	...	...	...	...	...	...	...	...	
96690	Pol-i-Abgineh	♂	84	39	13	15	40	...	...	...	...	...	...	...	...	...	...	
96691	Pol-i-Abgineh	♂	82	37	12	15	41	...	15.7	14.3	...	3.7	9.0	7.6	5.6	5.9	10.8	
96692	Pol-i-Abgineh	♀	81	38	12	15	42	...	...	...	...	3.5	9.1	7.5	5.7	6.0	10.7	
96693	Pol-i-Abgineh	♂	84	40	12	14	41	...	15.7	14.6	...	3.6	9.3	7.8	5.8	6.2	11.2	
96694	Pol-i-Abgineh	♂	79	37	11	13	39	...	14.8	13.9	...	3.6	9.0	7.5	5.5	5.9	10.4	
96695	Pol-i-Abgineh	♂	80	38	11	14	41	...	15.4	14.1	...	3.6	...	7.7	5.5	5.8	10.9	
96696	Pol-i-Abgineh	♂	85	35	11	12	37	...	15.3	14.2	...	3.7	9.3	7.7	5.6	5.9	10.8	
96697	Pol-i-Abgineh	♂	87	33	11	11	41	...	15.4	14.1	...	3.7	9.2	7.7	5.6	6.0	10.7	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Myotis capaccinii																		
FMNH 96698	Pol-i-Abgineh	♂	84	35	11	13	38	...	14.9	13.7	...	3.7	8.8	7.5	5.3	5.7	10.4	
96699	Pol-i-Abgineh	♂	78	36	12	12	39	...	15.0	13.8	...	3.6	8.6	7.5	5.4	5.7	10.3	
96702	Pol-i-Abgineh	♂	78	33	12	14	40	6	...	...	...	...	...	...	...	...	...	Alcohol
96704	Pol-i-Abgineh	♂	82	33	11	12	39	6	...	...	...	...	...	...	...	...	...	Alcohol
96706	Pol-i-Abgineh	♀	88	37	13	15	42	6	...	...	...	...	...	...	...	...	...	Alcohol
96708	Pol-i-Abgineh	♂	83	34	11	13	40	7	...	...	...	...	...	...	...	...	...	Alcohol
96709	Pol-i-Abgineh	♂	87	34	12	13	40	7	...	...	...	...	...	...	...	...	...	Alcohol
96710	Pol-i-Abgineh	♂	86	36	13	14	39	7	...	...	...	...	...	...	...	...	...	Alcohol
96711	Pol-i-Abgineh	♂	83	34	11	15	40	7	...	...	...	...	...	...	...	...	...	Alcohol
96712	Pol-i-Abgineh	♂	87	35	13	14	40	7	...	...	...	...	...	...	...	...	...	Alcohol
96714	Pol-i-Abgineh	♂	84	33	14	14	40	7	...	...	...	...	...	...	...	...	...	Alcohol
96715	Pol-i-Abgineh	♂	84	34	13	13	39	6	...	...	...	...	...	...	...	...	...	Alcohol
96716	Pol-i-Abgineh	♂	86	34	12	13	41	7	...	...	...	...	...	...	...	...	...	Alcohol
96717	Pol-i-Abgineh	♂	85	36	13	13	40	7	...	...	...	...	...	...	...	...	...	Alcohol
96719	Pol-i-Abgineh	♂	86	35	13	13	40	7	...	...	...	...	...	...	...	...	...	Alcohol
98393	Pol-i-Abgineh	♂	86	40	11	15	41	...	...	...	...	...	...	...	...	...	...	
98394	Pol-i-Abgineh	?	...	...	12	...	42	...	...	...	...	...	...	...	...	...	...	
111240	Persepolis	♂	92	36	12	14	41	8	...	14.3	...	3.6	9.2	7.8	5.3	5.8	10.8	
111241	Persepolis	♀	93	36	13	14	41	9	...	...	...	...	...	...	...	...	...	
111242	Persepolis	♀	90	41	12	14	42	7	...	...	...	...	...	...	...	...	...	
111243	Shahpur Cave	♂	95	38	13	13	43	8	15.9	14.4	...	3.7	9.5	8.1	5.7	6.0	11.0	
111244	Shahpur Cave	♂	95	38	13	13	40	8	15.7	14.2	...	3.6	9.2	7.6	5.6	5.9	10.8	
111245	Shahpur Cave	♀	95	35	12	14	42	7	...	...	...	...	...	...	...	...	...	
111246	Canae Gabru	♂	94	46	12	...	42	9	15.6	14.2	...	3.7	9.3	7.7	5.6	6.0	10.9	
USNM 350146	10 km. SE Kazerun	♂	95	39	14	17	40.3	10	...	...	...	...	...	...	...	...	...	
350147	10 km. SE Kazerun	♂	90	35	14	16	40.5	9	...	...	...	...	...	...	...	...	...	
Vespertilio murinus																		
FMNH 96764	Dasht	♂	97	41	8	16	44	...	15.0	...	...	4.2	9.3	7.9	4.9	5.3	10.6	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Vespertilio murinus																		
FMNH 111499	Sar Dasht	♀	114	48	10	15	42	5	15.4	15.2	...	4.3	9.7	8.3	5.1	5.5	10.1	
IPHR uncat.	Qom	♂	98	43	9	14.7	43.7	...	15.0	14.7	...	4.1	9.5	8.7	5.0	5.3	10.9	Skin badly damaged
Eptesicus nasutus pellucens																		
BM 5.10.4.2.	Ahvaz	♂	89	43	7	13	35.8	...	13.4	12.6	...	2.9	8.8	7.1	4.6	5.0	9.6	
5.10.4.3	Ahvaz	♂	87	42	7	13	36.2	...	...	...	...	3.0	...	...	4.8	5.0	9.9	
5.10.4.4	Ahvaz	♂	88	43	7	13	37.3	...	13.5	13.3	...	2.8	...	7.1	4.8	5.4	9.7	Holotype of *pellucens*
5.10.4.5	Ahvaz	♂	88	42	7	13	37.8	...	13.4	12.6	...	...	...	...	4.8	5.4	9.7	
5.10.4.6	Ahvaz	♂	86	42	7	13	35.5	...	13.1	12.6	...	2.9	8.5	6.9	4.6	4.8	9.6	
FMNH 111383	Meshrageh	♂	91	40	7	12	37.4	6	...	...	...	...	...	...	...	...	...	
111384	Meshrageh	♀	97	44	6	13	39.4	5	...	...	...	...	...	...	...	...	...	
111385	Meshrageh	♂	91	40	6	13	34.5	6	...	...	...	...	...	...	...	...	...	
111386	Meshrageh	♂	93	39	7	13	36.1	6	13.4	13.0	...	3.2	8.9	7.1	4.6	5.1	9.2	
111387	Meshrageh	♂	92	42	7	14	35.8	6	13.3	13.1	...	3.0	...	6.9	4.7	5.2	10.0	
111388	Meshrageh	♀	96	42	8	12	38.0	6	13.3	13.0	...	2.9	8.9	7.0	4.8	5.1	9.8	
111389	Meshrageh	♀	92	41	6	13	37.8	5	13.7	13.3	...	3.0	9.3	7.4	4.9	5.2	10.2	
111390	Meshrageh	♂	87	38	8	13	36.3	5	...	...	...	...	...	...	...	...	...	
111391	Meshrageh	♂	89	39	7	13	36.0	5	...	...	...	...	...	...	...	...	...	
111392	Meshrageh	♀	95	41	7	12	36.8	6	13.6	13.1	...	3.2	9.2	7.5	5.0	5.2	10.2	
	Bandar-e-Mashur	?	90.2	41.7	6.4	11.2	37.0	...	13.7	13.3	...	3.0	9.4	6.6	4.9	5.4	10.0	Etemad, 1973, p. 111, #1
	Bandar-e-Mashur	?	89.2	41.7	7.2	11.8	36.9	...	...	...	...	...	...	...	...	...	...	Etemad, 1973, p. 111, #2
Eptesicus nasutus nasutus																		
FMNH 111393	Minab	♀	91	42	8	14	38.2	5	13.0	12.5	...	3.0	8.9	6.9	4.6	5.1	9.7	
Eptesicus bobrinskii																		
BM 63.1186	Kutur Su	♂	...	30	8	11	35.0	5	14.7	14.3	...	4.1	...	7.8	5.0	5.6	10.6	Mummy in alcohol
63.1187	Kutur Su	♂	...	...	10	11	35.4	5	14.9	14.5	...	4.2	...	8.0	5.0	5.6	...	Mummy in alcohol
63.1188	Kutur Su	♀	...	30	6	11	35.1	5	...	...	...	...	...	...	...	...	...	Mummy in alcohol, immature

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Eptesicus bobrinskii																		
BM 63.1189	Kutur Su	♀	...	34	9	11	35.1	5	15.2	14.9	...	4.2	8.7	7.9	5.2	5.9	10.5	Mummy in alcohol
63.1190	Kutur Su	♀	...	35	10	11	35.7	5	15.3	14.7	...	4.1	...	8.1	5.1	...	...	Mummy in alcohol
63.1191	Kutur Su	?	...	...	...	11	33.9	5	...	...	...	...	...	...	...	...	...	Mummy in alcohol, immature
63.1192	Kutur Su	♂	...	...	...	...	34.7	...	14.6	14.0	...	3.7	...	8.0	5.2	5.7	...	Mummy in alcohol, immature
Eptesicus nilssoni																		
FMNH 96763	Sama	♂	99	43	10	15	37.7	...	15.9	15.5	...	4.1	9.5	7.6	5.3	5.7	10.8	
Eptesicus bottae ognevi																		
MZST 903	Zanjan	?	...	...	11.1	...	43.1	...	...	...	...	...	11.4	...	...	...	...	Mounted with skull intact
IPHR 703	Chelmir	♂	94	37	10	15	41.4	...	...	...	...	...	...	...	...	...	...	Alcohol
717	Chelmir	♂	107	45	10	15	44.3	...	...	...	...	...	...	...	...	...	...	Alcohol
uncat.	Chelmir	♂	93	44	9	19	42.4	...	17.1	16.8	...	3.8	10.9	9.0	6.4	7.0	13.0	A222
uncat.	Chelmir	♂	...	...	...	15	44.7	...	17.3	16.9	...	3.8	...	8.8	6.5	7.2	13.3	
uncat.	Chelmir	♂	101	45	10	15	45.8	...	17.5	16.9	...	4.1	12.2	9.4	6.0	6.7	12.9	MB2
Eptesicus bottae anatolicus																		
BM 2.10.1.1.	Basht	♀	126.5	48.5	10	17	49.4	...	18.4	17.6	...	4.0	12.8	9.3	6.7	7.7	13.9	
2.10.1.2	Telespid	♀	117.5	46.5	10	16.5	48.2	...	18.5	17.4	...	4.1	13.0	...	6.6	7.1	13.8	
5.10.4.1	Izeh	♀	111	45	9	17	46.3	...	17.9	17.8	...	3.9	12.8	...	6.2	7.4	14.1	
USNM 369543	Darab	♀	112	42	9	14	47.4	...	18.1	17.2	...	4.1	12.4	9.2	6.8	7.3	13.6	
Eptesicus serotinus serotinus																		
MZST 902	Qazvin or Zanjan	...	...	...	12.8	...	53.8	...	22.7	...	...	...	14.2	...	8.0	9.0	...	Mounted with skull intact. Holotype of *mirza*
BM 63.1185	Kutur Su	♂	...	53	11	17	52.5	7	21.5	20.1	...	4.3	...	10.4	7.8	8.7	16.1	Alcohol
10.8.12.1	Foot of Elburz	...	...	55	13	18	57.1	...	21.8	20.9	...	4.1	14.5	...	7.9	8.8	16.7	Alcohol
10.8.12.2	Foot of Elburz	...	125	46	12	18	51.1	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 96765	Sama	♂	132	57	13	20	52.2	...	...	...	...	...	...	...	...	...	...	
98403	Pahlavi Dezh	♀	...	...	...	...	53.0	...	...	...	...	...	...	...	...	...	...	Mummified

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Eptesicus serotinus serotinus																		
FMNH 98404	Pahlavi Dezh	♂	...	...	...	...	41.9	...	...	...	...	...	...	...	...	...	...	Mummified, immature
98405	Pahlavi Dezh	?	...	...	...	...	55.1	...	...	...	...	...	...	...	...	...	...	Mummified
98406	Pahlavi Dezh	♀	...	...	...	...	53.2	...	...	...	...	...	...	...	...	...	...	Mummified
98407	Pahlavi Dezh	?	...	...	...	...	52.8	...	...	...	...	...	...	...	...	...	...	Mummified
98408	Pahlavi Dezh	?	...	...	...	...	56.4	...	...	...	...	...	...	...	...	...	...	Mummified
98409	Pahlavi Dezh	?	...	...	...	...	...	...	21.5	20.7	...	4.3	13.9	10.2	7.6	8.7	15.9	Skull only
98410	Pahlavi Dezh	?	...	...	...	...	...	...	21.1	20.7	...	4.2	14.6	10.3	7.4	8.3	16.0	Skull only
98411	Pahlavi Dezh	?	...	...	...	...	...	...	...	...	...	4.2	...	...	7.2	7.9	15.2	Skull only
98412	Pahlavi Dezh	?	...	...	...	...	...	...	21.4	20.3	...	4.4	14.4	10.3	7.8	8.7	15.7	Skull only
98413	Pahlavi Dezh	?	...	...	...	...	...	...	21.4	20.6	...	4.6	15.2	10.8	7.7	8.8	16.0	Skull only
98414	Pahlavi Dezh	?	...	...	...	...	...	...	21.4	20.3	...	4.4	14.5	10.8	7.8	8.8	16.1	Skull only
MMTT 236	M.R.S. Nat. Pk.	♀	134	49	15	19	53.7	...	21.6	20.8	...	4.6	...	11.1	7.7	8.7	16.4	
239	M.R.S. Nat. Pk.	♂	130	49	15	18	54.2	...	21.4	20.6	...	4.4	14.2	10.9	7.6	8.5	16.3	
Eptesicus serotinus shiraziensis																		
BM 74.11.21.31	Shiraz	♀	...	56	14	15	57.9	8	23.2	21.6	...	4.4	...	11.6	8.4	9.3	17.6	Holotype of *shiraziensis*, Alcohol
25.10.4.10	Zarghum	♀	125	52	13	19	53.8	...	23.0	21.1	...	4.3	15.0	11.5	8.5	9.3	17.5	
Eptesicus serotinus turcomanus																		
IPHR uncat.	Chelmir	♂	...	49	12	19	52.4	...	20.2	19.5	...	4.5	13.5	10.7	...	8.2	15.1	A214
Nyctalus leisleri																		
FMNH 96760	Sama	♀	106	44	10	16	44.8	...	15.7	15.3	...	4.6	10.2	8.5	5.5	6.1	11.6	
96761	Sama	♀	105	43	9	17	42.8	...	16.0	15.0	...	4.5	...	8.3	5.3	6.0	...	Alcohol
96762	Sama	♀	112	49	10	17	45.2	...	15.9	15.6	...	4.7	10.3	8.6	5.7	6.2	11.7	
MMTT 237	M.R.S. Nat. Pk.	♂	100	35	8.9	14	...	...	15.4	15.1	...	4.5	...	9.0	5.5	6.0	11.7	
238	M.R.S. Nat. Pk.	♀	103	36	9.7	14	44.1	...	15.9	15.7	...	4.7	...	9.2	5.7	6.2	12.0	
Nyctalus noctula																		
BM 7.7.14.1	Rasht	♂	125	47	11	18	50.5	...	18.4	18.2	...	...	...	11.7	7.1	7.6	13.6	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Nyctalus noctula																		
BM 7.7.14.2	Rasht	♂	129	50	11	17	51.6	…	18.6	18.3	…	5.1	12.7	11.9	7.0	7.6	14.7	
	Shahsavar	♀	123.2	47.2	10.4	15.2	51.7	…	…	18.6	…	4.9	…	…	6.9	…	…	Etemad, 1969, pp. F153-155
	Shahsavar	♂	123.9	48.5	12.3	…	50.5	…	…	18.9	…	5.1	12.9	…	7.1	…	…	Etemad, 1969, pp. F153-155
IPHR uncat.	Shahsavar	♀	115	46	9	12	55.2	…	…	…	…	…	…	…	…	…	…	Skin only
uncat.	Shahsavar	♀	111	42	8	12	55.0	…	…	…	…	…	…	…	…	…	…	Skin only
uncat.	Shahsavar	♂	…	…	…	…	…	…	18.3	18.1	…	5.2	…	11.1	6.7	7.5	14.3	#1 skull only
uncat.	Shahsavar	♀	…	…	…	…	…	…	19.5	19.4	…	5.3	…	11.5	7.0	7.7	14.5	#2 skull only
uncat.	Shahsavar	♀	…	…	…	…	…	…	…	18.9	…	5.2	…	11.5	7.0	7.8	…	#3 skull only
uncat.	Shahsavar	?	…	…	…	…	…	…	19.0	18.8	…	5.1	…	11.4	7.0	7.3	…	#11 skull only
uncat.	Shahsavar	?	…	…	11.6	…	52.5	…	18.8	18.6	…	5.2	…	10.9	6.8	6.9	…	#12
uncat.	Shahsavar	?	…	…	10.5	…	50.4	…	18.8	18.8	…	5.2	…	11.7	7.0	7.5	14.6	#13
uncat.	Shahsavar	?	…	…	11.7	…	52.3	…	…	18.6	…	5.1	12.8	11.3	6.9	7.5	…	#14
uncat.	Shahsavar	?	…	…	…	…	52.4	…	18.7	18.6	…	5.0	12.9	11.1	7.1	7.4	14.9	#15
uncat.	Shahsavar	?	…	…	…	…	…	…	…	18.9	…	4.9	13.3	11.9	6.9	7.6	…	#16 skull only
uncat.	Shahsavar	?	…	…	…	…	…	…	19.2	19.0	…	5.1	…	10.8	7.3	7.8	…	#17 skull only
138	Siahkal	♀	…	…	…	…	53.2	…	…	…	…	…	…	…	…	…	…	Alcohol
Nyctalus lasiopterus																		
	Rud Sar	?	134.2	45.3	12.6	14.5	64.2	…	…	…	…	…	…	…	…	…	…	Etemad, 1970, p. 547. Mummy with skull intact
Pipistrellus p. pipistrellus																		
BM 7.7.14.4	S Coast of Caspian	♂	68	30	6.2	11	27.5	…	11.6	10.8	…	3.3	…	6.4	4.0	4.2	7.8	
	Babol	?	69.1	28	6.7	9.5	31.3	…	11.6	…	…	3.2	…	…	…	…	…	Etemad, 1969, pp. F160, 161
FMNH 96440	Sama	♀	76	30	8	12	32.4	…	…	…	…	…	…	…	…	…	…	
96444	8 km. N Gorgan	♂	70	31	6	10	30.3	…	11.5	11.1	…	3.3	…	6.7	3.7	4.1	8.1	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Pipistrellus p. pipistrellus																		
FMNH 96445	4.8 km. W Pahlavi Dezh	♀	72	31	5	10	31.5	...	11.7	11.1	...	3.3	...	6.6	3.9	...	...	
96446	4.8 km. W Pahlavi Dezh	♀	...	...	...	...	...	...	...	...	...	...	...	...	3.9	...	8.2	Skull only
98395	4.8 km. W Pahlavi Dezh	?	...	...	...	...	29.4	...	...	...	...	...	...	...	...	...	...	Mummy
98396	4.8 km. W Pahlavi Dezh	?	...	...	...	...	25.2	...	...	...	...	...	...	...	...	...	...	Mummy
98397	4.8 km. W Pahlavi Dezh	?	...	...	...	...	30.1	...	...	...	...	...	...	...	...	...	...	Mummy
98398	4.8 km. W Pahlavi Dezh	?	...	...	...	...	29.5	...	...	...	...	...	...	...	...	...	...	Mummy
98399	4.8 km. W Pahlavi Dezh	?	...	...	...	...	...	...	...	...	...	3.3	...	...	4.7	...	...	Mummy
98400	4.8 km. W Pahlavi Dezh	?	...	...	...	...	30.3	...	...	...	...	...	...	...	...	...	...	
98401	4.8 km. W Pahlavi Dezh	?	...	...	...	...	...	...	...	...	...	3.3	...	6.6	...	4.2	...	Skull only
BM 27.10.26.6	Babol	♂	61	25	4	7	27.4	...	...	...	...	...	...	...	3.9	4.0	7.7	
27.10.26.7	Babol	?	62	25	5	7	27.8	...	...	...	...	...	...	...	...	...	...	
27.10.26.8	Babol	♂	57	25	4	7	27.4	...	...	...	...	...	...	...	...	...	...	Skull not found
27.10.26.10	Babol	♀	60	25	4	7	27.1	...	...	...	...	...	...	...	...	...	...	Skull not found
27.10.26.12	Babol	♀	55	23	4	6	27.5	...	...	10.4	...	...	...	...	...	...	...	Skull not cleaned
27.10.26.13	Babol	♀	70	30	4	7	29.0	...	12.0	11.1	...	3.2	...	6.6	4.0	4.3	8.4	
27.10.26.14	Babol	♀	63	27	4	7	29.1	...	...	...	...	...	...	...	3.7	...	...	
27.10.26.15	Babol	♀	65	30	4	7	29.4	...	11.6	10.8	...	3.1	...	6.1	3.9	4.0	8.0	
27.10.26.16	Babol	♀	70	30	4	7	29.9	...	11.5	10.8	...	3.3	...	6.6	4.0	4.0	8.0	
SMNS 4052	Gonbad-i-Kavus	♀	...	...	5.0	...	30.1	...	11.5	10.8	...	3.4	...	6.4	3.7	4.1	8.0	
4053	Gonbad-i-Kavus	♂	...	...	4.5	...	30.4	...	11.7	11.0	...	3.3	...	6.4	3.7	3.9	8.0	
4054	Gonbad-i-Kavus	♀	...	...	5.9	...	30.1	...	...	...	...	3.2	...	6.5	3.9	4.0	7.9	
4055	Gonbad-i-Kavus	♂	...	...	5.3	...	30.5	...	...	11.0	...	3.3	...	6.6	4.0	...	...	
IPHR 160	Siahkal	♂	...	...	...	...	29.1	...	...	...	...	...	...	...	...	...	...	Alcohol
uncat.	Siahkal	?	68	27	5	11	28.6	...	...	...	...	...	...	...	...	...	...	AFA105, skull not found
USNM 340975	3 km. SW Dasht	♀	72	30	7	10	31.5	6	...	...	...	...	...	...	...	...	...	
MMTT uncat.	Tir Tash	♀	68	25	7	10	29.5	4	...	...	...	...	...	...	...	...	...	#5, alcohol
uncat.	Tir Tash	♀	73	28	7	11	30.3	4	...	...	...	...	...	...	...	...	...	#9, alcohol
uncat.	Tir Tash	♀	69	30	6	11	30.6	4	...	...	...	...	...	...	...	...	...	#47, alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Pipistrellus p. pipistrellus																		
MMTT uncat.	Tir Tash	♀	68	26	7	10	30.5	4	...	...	...	...	...	...	...	...	...	#65, alcohol
Pipistrellus p. aladdin																		
IPHR uncat.	Loft-abad	♂	55	26	6.5	8	30.5	...	...	...	...	...	...	...	...	...	...	Skin only, immature
uncat.	Loft-abad	♂	...	...	5.8	...	30.1	...	...	...	...	...	...	...	...	...	...	Skin only
uncat.	Loft-abad	♂	...	...	6.1	...	30.5	...	...	...	...	...	...	...	...	...	...	Skin only, immature
uncat.	Loft-abad	♀	...	...	6.1	...	30.2	...	...	...	...	...	...	...	...	...	...	Skin only, immature
uncat.	Loft-abad	♀	...	...	5.0	...	30.2	...	...	...	...	...	...	...	...	...	...	Skin only, immature
uncat.	Loft-abad	?	...	...	...	...	...	...	...	11.2	...	3.4	7.5	6.2	4.0	...	...	Skull only
uncat.	Loft-abad	?	...	...	...	...	...	...	...	11.0	...	3.5	7.5	6.4	4.1	...	...	Skull only
uncat.	Loft-abad	?	...	...	...	...	...	...	11.7	10.8	...	3.3	7.2	6.3	3.8	...	...	Skull only
uncat.	Loft-abad	?	...	...	...	...	...	...	...	10.7	...	3.4	7.5	6.4	4.0	...	...	Skull only
590	Chelmir	♀	...	...	...	...	31.9	...	...	...	...	...	...	...	...	...	...	Alcohol
592	Chelmir	♀	...	...	...	...	33.0	...	...	...	...	...	...	...	...	...	...	Alcohol
593	Chelmir	♀	...	...	...	...	31.2	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
594	Chelmir	♀	...	...	...	...	32.1	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
595	Chelmir	♂	...	...	...	...	30.4	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
596	Chelmir	♀	...	...	...	...	31.2	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
597	Chelmir	♀	...	...	...	...	30.1	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
598	Chelmir	♂	...	...	...	...	31.6	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
599	Chelmir	♀	...	...	...	...	31.6	...	...	...	...	...	...	...	...	...	...	Alcohol
600	Chelmir	♀	...	...	...	...	31.4	...	...	...	...	...	...	...	...	...	...	Alcohol
601	Chelmir	♂	...	...	...	...	31.5	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
602	Chelmir	♂	...	...	...	...	31.4	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
603	Chelmir	♀	...	...	...	...	32.9	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
604	Chelmir	♀	...	...	...	...	31.6	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
605	Chelmir	♀	...	...	...	...	30.6	...	...	...	...	...	...	...	...	...	...	Alcohol
606	Chelmir	♀	...	...	...	...	31.6	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Pipistrellus p. alladin																		
IPHR 607	Chelmir	♀	...	...	...	...	31.5	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
608	Chelmir	♂	...	...	...	...	30.9	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
609	Chelmir	♀	...	...	...	...	30.9	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
611	Chelmir	♂	...	...	...	...	30.3	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
612	Chelmir	♀	...	...	...	...	30.2	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
613	Chelmir	♂	...	...	...	...	30.3	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
614	Chelmir	♂	...	...	...	...	31.0	...	...	...	...	...	...	...	...	...	...	Alcohol, immature
644	Chelmir	♀	...	...	...	...	30.1	...	...	...	...	...	...	...	...	...	...	Alcohol
1033	71 km. SE Mashhad	♂	...	...	...	...	29.6	...	...	...	...	...	...	...	...	...	...	Alcohol
1034	71 km. SE Mashhad	♂	...	...	...	...	32.0	...	...	...	...	...	...	...	...	...	...	Alcohol
1035	71 km. SE Mashhad	♀	...	...	...	...	32.6	...	...	...	...	...	...	...	...	...	...	Alcohol
1036	71 km. SE Mashhad	♀	...	...	...	...	33.4	...	...	...	...	...	...	...	...	...	...	Alcohol
1037	71 km. SE Mashhad	♀	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Alcohol
1038	71 km. SE Mashhad	♀	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Alcohol
1039	71 km. SE Mashhad	♀	...	...	...	...	30.6	...	...	...	...	...	...	...	...	...	...	Alcohol
1040	71 km. SE Mashhad	♂	...	...	...	...	30.5	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 111394	8 km. NW Kuh Rang	♀	76	35	5	11	31	5	...	...	...	...	...	...	...	...	...	
111395	8 km. NW Kuh Rang	♀	78	36	6	11	32	6	12.0	11.4	...	3.3	...	6.6	4.0	4.4	8.4	
111396	8 km. NW Kuh Rang	♂	74	33	6	10	30	5	...	...	...	3.2	...	...	4.1	4.3	8.3	
111397	8 km. NW Kuh Rang	♂	72	32	6	10	30	5	...	...	...	3.2	...	...	3.8	4.0	8.1	
111398	8 km. NW Kuh Rang	?	76	34	6	11	32	5	...	...	...	...	...	...	...	...	...	Alcohol
111399	8 km. NW Kuh Rang	?	76	31	6	10	33	5	...	...	...	...	...	...	...	...	...	Alcohol
111400	8 km. NW Kuh Rang	♂	76	32	6	11	30.2	5	...	...	...	...	...	...	...	...	...	Alcohol
111401	Sar Dasht	♂	76	35	7	11	33	3	...	...	...	...	...	...	4.0	4.4	8.3	
111599	Shahpur Cave	?	...	...	6	6	27	4	...	...	...	...	...	...	3.9	4.4	8.2	Wing & skull only
111455	Jahrom	♂	80	34	5	10	30	5	...	...	...	...	...	...	...	...	...	
111466	Ilam	♂	77	34	5	11	30	5	11.8	11.1	...	3.2	7.1	6.5	3.9	4.3	8.2	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Pipistrellus p. aladdin																		
FMNH 111402	6.4 km. N Kermanshah	♂	81	34	7	11	32	5	...	...	...	...	...	...	...	...	...	Alcohol
111403	6.4 km. N Kermanshah	♀	75	30	6	10	31	5	...	...	...	...	...	...	...	...	...	Alcohol
111404	6.4 km. N Kermanshah	♀	76	32	7	9	32	4	...	...	...	...	...	...	...	...	...	
111405	7.2 km. N Kermanshah	♂	78	34	5	9	30	3	11.6	11.2	...	3.3	6.9	6.4	4.0	4.2	8.2	
111406	7.2 km. N Kermanshah	♀	78	35	6	9	33	3	...	...	...	...	...	...	...	...	...	
111407	7.2 km. N Kermanshah	♀	76	33	6	8	32	3	12.3	11.5	...	3.2	...	6.5	4.2	4.5	8.4	
111408	7.2 km. N Kermanshah	♀	75	37	5	11	31	4	11.6	11.1	...	3.2	7.4	6.5	4.0	4.2	8.3	
111409	7.2 km. N Kermanshah	♀	75	36	6	10	30	5	...	...	...	...	...	...	...	...	...	Alcohol
111410	7.2 km. N Kermanshah	♀	80	36	7	11	32	5	...	...	...	...	...	...	...	...	...	Alcohol
111411	7.2 km. N Kermanshah	♀	78	36	5	10	31	5	...	...	...	...	...	...	...	...	...	Alcohol
111412	7.2 km. N Kermanshah	♀	79	35	6	10	32	4	...	...	...	...	...	...	...	...	...	Alcohol
111413	7.2 km. N Kermanshah	♀	82	37	5	11	33	5	...	...	...	...	...	...	...	...	...	Alcohol
111379	1.6 km. S Khurramabad	♀	79	33	6	12	33	5	...	...	...	3.3	7.4	6.5	4.2	4.4	8.6	
BM 5.10.4.13	Darband	♂	76	35	6.3	10	29.5	...	11.9	11.1	...	3.2	7.2	6.5	4.1	4.2	8.3	Holotype of *aladdin*
20.2.9.12	Shiraz	♂	73	35	7	12	30.7	...	11.8	...	...	...	6.4	6.7	...	...	...	Immature, skull not clean
20.2.9.13	Shiraz	♂	72	34	7	12	31.3	...	11.9	10.8	...	...	6.2	6.6	...	...	...	Immature, skull not clean
20.2.9.14	Shiraz	♂	73	35	7	12	29.6	...	11.7	10.8	...	...	6.0	6.5	...	...	...	Immature, skull not clean
20.2.9.15	Shiraz	♀	73	34	7	12	31.0	...	12.1	11.4	...	...	6.4	6.7	...	...	...	Immature, skull not clean
20.2.9.16	Shiraz	♀	71	34	7	12	30.6	...	12.3	11.4	...	...	6.7	6.8	...	...	...	Immature, skull not clean
20.2.9.17	Shiraz	♀	75	35	7	12	31.5	...	...	...	...	...	...	...	...	...	...	Immature
FMNH 96442	Maku	♀	75	33	7	11	30.5	...	11.8	11.3	...	3.1	7.2	6.4	4.2	4.4	8.0	
96443	Maku	♂	72	31	8	11	30	4	...	...	...	...	...	...	...	...	...	Alcohol
	Kazerun	♀	77.1	36.3	7.8	11.2	31.8	...	13.2	12.5	...	3.3	...	6.5	4.5	5.0	...	Etemad, 1969, pp. F175-177
SMF 46397	Rafsanjan	♂	...	...	...	...	30	...	11.0	10.5	...	...	6.7	...	3.8	...	...	Felten, pers. comm., 1975
BM 74.11.21.27	Kerman	♂	...	...	5.7	...	35.0	...	...	...	...	...	...	...	...	...	...	Alcohol
74.11.21.28	Neyriz	♀	...	...	6.8	...	35.5	...	13.3	12.6	...	3.1	...	7.6	4.7	...	...	Alcohol
5.10.4.7	Ahvaz	♂	85	40	7.5	13	33.7	...	...	...	...	3.4	...	...	4.7	5.2	9.5	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Pipistrellus p. aladdin																		
BM 5.10.4.8	Ahvaz	♂	81	39	7.8	13	34.3	...	...	...	...	3.3	...	...	...	5.1	9.4	
5.10.4.9	Ahvaz	♂	82	37	7	13	31.9	...	13.2	12.5	...	3.5	...	7.5	4.7	4.9	9.5	
5.10.4.10	Ahvaz	♂	86	41	7.2	13	34.4	...	13.6	12.9	...	3.4	8.3	7.7	4.8	5.3	9.6	
5.10.4.11	Ahvaz	♂	87	41	7	13	33.0	...	13.1	12.4	...	3.4	8.5	7.5	4.6	5.0	9.5	
5.10.4.12	Dezful	♀	83	38	7.2	13	32.1	...	12.9	12.1	...	3.2	...	7.5	4.4	4.9	9.5	
7.7.14.3	Tehran	♂	81	38	8.2	13	33.9	...	13.2	12.8	...	3.2	8.4	7.2	4.7	5.0	9.6	
FMNH 82746	Nag	♂	78	38	8	13	...	...	...	...	...	...	...	...	...	...	...	Immature
BM 2.10.1.4	Kamaraj	♀	79	32	7	11.5	...	...	13.2	12.5	...	3.3	...	7.4	4.7	5.2	9.3	
2.10.1.3	Shiraz	♀	80.5	35	9	10.5	35.3	...	12.8	12.2	...	3.2	...	7.2	4.5	4.9	9.6	
20.2.9.6	Shiraz	♀	82	41	8	12	33.7	...	12.8	12.2	...	3.2	...	7.4	4.6	5.0	9.5	
20.2.9.7	Shiraz	♀	80	38	8	12	32.2	...	13.6	11.8	...	...	...	...	...	...	...	Skull not cleaned
20.2.9.8	Shiraz	♀	77	37	7	12	31.9	...	12.3	11.7	...	...	...	...	...	...	...	Skull not cleaned
20.2.9.9	Shiraz	♀	74	34	7	12	32.3	...	12.6	12.2	...	...	...	...	...	...	...	Skull not cleaned
20.2.9.10	Shiraz	♀	77	37	7	12	32.7	...	12.4	11.4	...	...	...	...	...	...	...	Skull not cleaned
20.2.9.11	Shiraz	♀	81	34	7	12	32.0	...	12.7	11.6	...	...	...	...	...	...	...	Skull not cleaned
FMNH 96745	Faraman	♂	85	40	8	12.5	35	...	13.0	12.6	...	3.2	...	7.0	4.5	5.1	9.6	
96744	19.3 km. S Shush	♂	79	37	7	12	37	...	12.9	12.5	...	3.3	8.1	7.0	4.6	5.0	9.8	
96741	Ahram	♂	82	40	7	11	34	...	13.5	12.6	...	3.4	8.3	7.4	4.8	5.1	9.8	
96742	Ahram	♀	75	36	7	13	34	...	...	...	...	3.3	...	7.0	4.3	4.8	9.1	
96743	Ahram	♂	80	30	7	13	48	...	12.9	12.4	...	3.3	...	7.3	4.5	5.0	9.1	
96722	Lake Famur	♀	79	35	7	13	33	...	...	...	...	...	...	...	...	...	...	
96723	Lake Famur	♂	87	39	7	12	32	...	...	...	...	...	...	...	...	...	...	
96724	Lake Famur	♀	82	37	7	13	35	...	...	...	...	...	...	...	...	...	...	
96725	Lake Famur	♂	80	35	7	12	33	...	...	...	...	...	...	...	...	...	...	
96726	Lake Famur	♂	82	38	7	13	33	...	13.0	12.5	...	3.3	...	7.2	4.5	5.0	9.0	
96727	Lake Famur	♂	82	36	6	12	34	...	13.4	12.5	...	3.4	...	7.7	4.7	5.1	9.8	
96728	Lake Famur	♂	83	37	7	13	38	...	13.1	12.5	...	3.5	...	7.3	4.6	5.0	9.5	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Pipistrellus p. aladdin																		
FMNH 96729	Lake Famur	♂	87	33	8	13	36	...	13.2	12.7	...	3.2	...	7.3	4.7	5.2	9.7	
96730	Lake Famur	♀	82	35	8	12	33	...	12.6	12.1	...	3.2	...	6.9	4.3	4.9	9.0	
96731	Lake Famur	♂	80	31	7	11	33	...	...	...	...	...	...	...	...	...	...	
96732	Lake Famur	♂	78	30	6	11	34	...	...	...	...	...	...	...	...	...	...	
96733	Lake Famur	♀	79	31	7	12	33	...	...	...	...	...	...	...	...	...	...	
96734	Lake Famur	♂	77	29	6	11	35	...	...	...	...	...	...	...	...	...	...	
96736	Lake Famur	♂	81	34	7	11	34	...	...	...	...	...	...	...	...	...	...	
96737	Lake Famur	♂	82	34	7	12	34	...	...	...	...	...	...	...	...	...	...	
98402	Lake Famur	♂	83	37	7	13	34	...	...	...	...	...	...	...	...	...	...	
96738	Shahpur Cave	♂	81	32	6	13	31	...	13.1	12.4	...	3.2	...	7.0	4.5	5.1	9.0	
96739	Shahpur Cave	♂	79	33	6	12	31	...	12.8	12.2	...	3.4	...	7.1	4.4	4.5	9.2	
96740	Shahpur Cave	♂	81	32	6	12	30	...	13.0	12.0	...	3.5	...	6.8	4.5	4.8	...	
BM 25.10.4.4	Band-e Amir	♀	76	34	8	12	33.2	...	12.8	...	...	3.2	...	7.1	4.5	4.9	9.0	
25.10.4.1	Zarghum	♀	78	38	7	13	36.7	...	13.2	12.5	...	3.4	...	7.4	4.6	5.0	9.5	
25.10.4.2	Zarghum	♀	79	39	7	13	33.7	...	12.6	11.9	...	3.3	...	7.1	4.5	4.9	9.1	
SMNS 5055	Jiroft	♀	40	30	7	...	32.8	...	12.6	11.8	...	3.0	...	6.4	3.7	4.8	9.0	Immature
5056	Jiroft	♂	38	31	6.5	...	29.0	...	...	...	...	3.3	...	6.3	4.3	4.6	8.8	Immature
BM 52.1467	Iranshahr	♀	...	...	...	...	33.5	...	13.4	...	...	3.5	...	...	...	5.6	9.9	
8.1.13.1	"Seistan"	?	...	...	...	...	32.5	...	13.2	12.5	...	3.3	...	7.3	4.6	5.0	9.3	
	Zabol	♂	83.3	32.8	7.3	10.7	35.7	...	13.8	13.2	...	3.5	...	6.7	5.0	5.4	...	Etemad, 1969, pp. F175-177
	Konar-Takhteh	♀	74.7	31.9	5.7	10.2	31.6	...	12.3	11.9	...	3.2	8.6	6.4	4.5	5.0	...	Etemad, 1969, pp. F175-177
IPHR 3311	3 km. Shushtar	♂	...	...	...	...	31.5	...	...	...	...	...	...	...	...	...	...	Alcohol
3472	3 km. Shushtar	♀	...	...	...	...	33.2	...	...	...	...	...	...	...	...	...	...	Alcohol
3473	3 km. Shushtar	♂	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Alcohol
3479	Darkhovin	?	...	...	...	...	35.1	...	...	...	...	...	...	...	...	...	...	Alcohol
3553	Darkhovin	♀	...	...	...	...	33.9	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Pipistrellus p. aladdin																		
IPHR 3924	20 km. W Tabas	♂	...	...	...	...	30.9	...	...	...	...	...	...	...	...	...	...	Alcohol
3961	Sahlabad	?	...	...	...	...	33.4	...	...	...	...	...	...	...	...	...	...	Alcohol
3962	Sahlabad	?	...	...	...	...	32.8	...	...	...	...	...	...	...	...	...	...	Alcohol
SMF 46398	Rafsanjan	♀	50	38	8	11	36	7	13.0	12.5	...	...	...	...	4.8	...	...	Felten, pers. comm., 1975
47843	Tabriz	♂	...	...	...	...	35	...	13.3	12.9	...	...	...	...	4.8	...	...	Felten, pers. comm., 1975
USNM 350143	Qasr-i-shirin	♀	82	36	6	11	34.8	5	...	...	...	...	...	...	...	...	...	
350144	Qasr-i-shirin	♀	86	40	7	13	33.7	7	...	...	...	...	...	...	...	...	...	
350145	Qasr-i-shirin	♂	83	38	5	10	33.4	5	...	...	...	...	...	...	...	...	...	
369542	13 km. SE Shiraz	♂	89	36	7	13	34.8	6	...	...	...	...	...	...	...	...	...	
326706	3 km. N Duruh	♀	87	40	7	14	33.7	7	...	...	...	...	...	...	...	...	...	
327991	5 km. NE Esfideh	♀	87	41	9	13	33.7	7	...	...	...	...	...	...	...	...	...	
327992	5 km. NE Esfideh	♀	86	38	8	14	33.5	6	...	...	...	...	...	...	...	...	...	
327993	5 km. NE Esfideh	♀	91	43	8	11	34.4	6	...	...	...	...	...	...	...	...	...	
327994	5 km. NE Esfideh	♀	85	40	8	12	32.5	6	...	...	...	...	...	...	...	...	...	
327995	5 km. NE Esfideh	♂	87	40	9	12	34.6	6	...	...	...	...	...	...	...	...	...	
FMNH 111380	1.6 km. S Khurramabad	♂	89	39	6	14	33	6	12.9	12.4	...	3.2	8.1	7.2	4.6	5.1	9.4	
111414	Meshrageh	♂	92	39	7	13	35	7	...	...	...	...	...	...	...	...	...	
111415	Shush	♂	95	45	7	13	36	6	13.5	13.0	...	3.5	...	7.8	4.8	5.2	9.6	
111416	Shush	♀	96	41	7	11	36	7	...	...	...	...	...	...	...	...	...	
111417	Shush	♀	93	40	7	12	35	7	13.4	12.8	...	3.3	...	7.6	4.7	5.0	8.8	
111418	Shush	♂	92	40	7	11	34	6	13.1	12.6	...	3.6	8.4	7.5	4.6	5.1	9.7	
111419	Shush	♀	92	41	8	13	35	7	13.0	12.6	...	3.4	...	7.5	4.5	5.0	8.7	
111420	Shush	♀	90	38	7	14	35	7	13.3	12.8	...	3.5	...	7.7	4.7	5.1	9.6	
111421	Shush	♂	89	36	6	12	33	6	13.2	12.5	...	3.6	8.6	7.5	4.6	4.9	9.4	
111422	Shush	♂	91	40	7	13	34	6	13.3	12.6	...	3.2	8.4	7.5	4.7	5.1	9.3	
111423	Shush	♀	95	41	7	13	36	7	13.6	13.2	...	3.4	8.6	7.8	4.7	5.1	9.8	
111424	Shush	♀	89	37	7	12	34	6	13.2	12.5	...	3.5	8.6	7.6	4.6	5.1	9.7	
111425	Shush	♀	89	39	8	12	33	6	13.0	12.6	...	3.4	8.4	7.5	4.6	4.9	9.5	

Identification	Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Pipistrellus p. aladdin																	
FMNH 111426 Shush	♀	92	41	7	13	35	6	…	12.8	…	3.3	…	7.5	4.5	5.1	9.4	
111427 Shush	♀	87	37	7	13	32	7	…	…	…	…	…	…	…	…	…	Alcohol
111428 Shush	♀	85	43	8	13	35	7	…	..	…	…	…	…	…	…	…	Alcohol
111429 Shush	♀	90	39	8	12	36	7	…	…	…	…	…	…	…	…	…	Alcohol
111430 Shush	♀	91	39	7	12	33	7	…	…	…	…	…	…	…	…	…	Alcohol
111431 Shush	♀	92	40	7	13	34	6	…	…	…	…	…	…	…	…	…	Alcohol
111432 Shush	♀	91	40	7	12	35	7	…	…	…	…	…	…	…	…	…	Alcohol
111433 Shush	♀	90	40	7	12	35	7	…	…	…	…	…	…	…	…	…	Alcohol
111434 Shush	♀	95	40	8	12	34	7	…	…	…	…	…	…	…	…	…	Alcohol
111435 Shush	♀	90	37	8	12	33	6	…	…	…	…	…	…	…	…	…	Alcohol
111436 Shush	♀	92	38	7	12	34	6	…	…	…	…	…	…	…	…	…	Alcohol
111437 Shush	♀	94	40	8	13	34	7	…	…	…	…	…	…	…	…	…	Alcohol
111438 Shush	♀	92	38	7	13	34	6	…	…	…	…	…	…	…	…	…	Alcohol
111439 Shush	♀	93	42	7	12	34	6	…	…	…	…	…	…	…	…	…	Alcohol
111440 Shush	♂	98	34	7	13	33	6	12.8	12.3	…	3.4	8.3	7.4	4.4	5.0	9.5	
111441 Shush	♀	87	36	6	15	34	6	13.0	12.3	…	3.4	…	7.6	4.6	5.1	8.9	
111442 Shush	♂	87	36	7	13	34	6	13.1	12.6	…	3.3	8.4	7.6	4.7	5.1	9.5	
111443 Shush	♀	89	35	7	15	36	6	13.6	13.0	…	3.4	…	7.7	4.7	5.2	9.3	
111444 Shush	♀	86	35	7	14	35	6	…	…	…	…	…	…	…	…	…	Alcohol
111445 Shush	♂	89	35	8	14	34	6	13.4	12.7	…	3.5	8.5	7.6	4.5	4.9	9.3	
111446 Shush	♀	89	36	7	14	35	6	…	…	…	…	…	…	…	…	…	Alcohol
111447 Shush	♀	86	35	7	15	34	6	…	…	…	…	…	…	…	…	…	Alcohol
111448 Shush	♀	87	36	7	15	33	6	13.5	12.8	…	3.4	…	7.7	4.6	5.2	9.9	
111449 Shush	♀	88	36	7	14	35	6	13.2	12.6	…	3.5	8.6	7.7	4.6	5.1	9.5	
111450 Shush	♀	88	37	7	14	33	6	12.6	12.1	…	3.3	8.4	7.5	4.4	5.1	8.6	
111451 Shush	♀	87	36	7	14	34	6	…	…	…	…	…	…	…	…	…	
111452 Shush	♀	87	38	7	15	35	7	…	…	…	…	…	…	…	…	…	
111453 Shush	♀	87	34	7	15	34	6	…	…	…	…	…	…	…	…	…	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Pipistrellus p. aladdin																		
FMNH 111454	Shush	♀	92	37	7	15	36	7	...	...	...	...	...	...	...	...	...	
111469	Persepolis	♀	90	42	8	12	35	8	13.1	12.5	...	3.0	8.0	7.1	4.5	4.9	9.3	
111470	Persepolis	♀	90	38	7	14	35	8	...	...	...	3.5	...	7.5	4.7	5.0	9.9	
111471	Persepolis	♀	93	42	8	14	36	7	...	...	...	3.2	...	...	4.6	5.1	9.5	
111472	Persepolis	♂	90	37	8	12	...	6	...	...	...	...	...	...	...	...	...	Alcohol, specimen missing
111473	Persepolis	♀	87	37	7	11	...	6	...	...	...	...	...	...	...	...	...	Alcohol, specimen missing
111498	Persepolis	♀	87	37	8	11	33	7	...	...	...	...	...	...	4.5	4.9	...	
111474	Shiraz area	♂	88	38	7	12	35	6	13.1	12.4	...	3.4	8.5	7.3	4.5	4.8	8.7	
111475	Shiraz area	♀	85	37	6	12	32	7	13.2	12.2	...	3.2	...	7.3	4.6	4.8	9.2	
111476	Shiraz	♀	88	40	8	12	32	7	13.4	12.8	...	3.2	8.1	7.2	4.6	5.1	9.8	
111477	Shiraz area	♀	87	38	7	12	31	8	...	...	...	...	...	...	...	...	...	Alcohol
111478	Shiraz area	?	...	...	...	...	30	...	...	...	...	...	...	...	...	...	...	Mummified
111456	Jahrom	♂	82	39	6	12	34	6	...	...	...	...	...	...	...	...	...	Alcohol
111479	Jahrom	♀	88	40	7	12	34	7	13.0	12.5	...	3.4	8.4	7.1	4.5	4.9	9.3	
111480	Jahrom	...	90	42	8	12	35	7	13.0	12.5	...	3.2	...	7.2	4.7	5.1	9.6	
111481	Jahrom	♀	90	38	8	12	35	7	...	...	...	...	...	...	...	...	...	
111482	Jahrom	♂	91	42	7	11	35	7	13.0	12.4	...	3.3	8.3	7.2	4.6	4.9	8.9	
111483	Jahrom	♂	88	38	7	12	31	7	12.6	11.9	...	3.1	8.1	7.0	4.5	4.9	9.1	
111484	Jahrom	♂	92	41	7	11	31	7	...	...	...	...	...	...	...	...	...	Specimen missing
111485	Jahrom	♀	91	40	7	12	35	7	12.7	12.0	...	3.5	...	7.0	4.5	4.8	8.5	
111486	Jahrom	♂	91	42	7	13	34	8	12.6	...	...	3.1	8.0	7.0	4.5	4.9	9.6	
111487	Jahrom	♀	92	42	7	12	35	7	13.3	12.7	...	3.2	...	7.4	4.7	5.1	9.5	
111488	Jahrom	♀	86	39	7	11	34	7	...	...	...	...	...	...	...	...	...	
111489	Jahrom	♀	90	40	7	11	34	7	...	...	...	...	...	...	...	...	...	
111490	Jahrom	♀	92	40	7	11	35	7	...	...	...	...	...	...	...	...	...	
111491	3.2 km. W Jahrom	♀	90	42	7	12	35	7	...	...	...	...	...	...	...	...	...	
111492	3.2 km. W Jahrom	♂	92	42	7	11	35	6	...	...	...	...	...	...	...	...	...	
111493	3.2 km. W Jahrom	♂	88	38	7	11	31	6	...	...	...	...	...	...	...	...	...	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Pipistrellus p. aladdin																		
FMNH 111494	3.2 km. W Jahrom	♀	87	40	7	11	31	6	...	...	...	...	...	...	...	...	...	
111495	3.2 km. W Jahrom	♂	87	40	7	12	33	7	...	...	...	...	...	...	...	...	...	
111496	3.2 km. W Jahrom	♀	86	33	6	12	33	7	...	...	...	...	...	...	...	...	...	
111497	3.2 km. W Jahrom	♀	90	42	7	12	33	7	...	...	...	...	...	...	...	...	...	
111457	Bastak	♀	86	35	8	13	33	6	13.0	12.1	...	3.1	...	7.0	4.7	5.0	9.0	
111458	Bastak	♀	82	31	6	10	34	4	12.8	12.0	...	3.2	...	7.0	4.4	5.0	9.3	
111459	Chah Moslem	♀	93	39	6	13	...	6	...	...	...	...	...	...	...	...	...	Alcohol
111460	Chah Moslem	♀	81	32	6	12	33	5	12.6	11.9	...	3.2	7.7	6.9	4.4	4.8	8.9	
111461	Chah Moslem	♂	80	32	6	11	32	5	12.8	12.2	...	3.2	8.0	7.0	4.5	4.8	9.5	
111462	Chah Moslem	♀	83	34	6	11	34	6	...	...	...	...	...	...	...	...	...	Alcohol
111463	Chah Moslem	♂	82	32	6	11	33	5	12.8	11.9	...	3.2	...	6.9	4.5	4.9	...	
111464	Chah Moslem	♀	86	33	6	12	34	6	12.7	12.0	...	3.1	7.8	6.8	4.5	4.9	9.0	
111465	Chah Moslem	?	86	33	6	12	34	6	...	...	...	...	...	...	...	...	...	Alcohol
BM 25.10.4.3	Shiraz	♀	74	35	7	11	32.7	...	12.1	11.3	...	3.1	...	6.7	4.1	...	7.0	
67.2304	Tehran	?	...	...	6.5	...	33.4	...	...	...	...	...	...	...	...	...	...	Alcohol
67.2305	Tehran	♀	...	...	6.7	...	34.7	...	...	...	...	...	...	...	...	...	...	Alcohol
10.8.12.3	"Foot of Elburz"	♂	...	...	6.6	...	34.2	...	...	...	...	...	...	...	...	...	...	Alcohol
10.8.12.4	"Foot of Elburz"	♂	...	...	7.0	...	33.6	...	...	...	...	...	...	...	...	...	...	Alcohol
MMTT 240	Quyun Daghi Is.	♀	86.5	40.2	9.4	12	37.0	...	...	...	...	...	...	...	4.9	...	...	Skull badly broken
241	26 km. E Haft Tappeh	♂	70	26	...	9	32.3	...	...	...	...	...	...	...	...	...	...	Skull missing
243	26 km. E Haft Tappeh	♀	82	31	...	11	33.5	...	...	...	...	...	...	...	...	...	...	Skull missing
uncat.	Bandar-e-Pahlavi	♀	89	34	8	12	35.0	...	...	...	...	...	...	...	...	...	...	Alcohol
Pipistrellus savii																		
IPHR uncat.	Chelmir	♀	80	33	7	14.2	33.5	...	14.2	13.4	...	3.5	...	7.5	4.5	4.7	10.1	P^1 absent
uncat.	Chelmir	♀	...	...	...	...	34.7	...	13.2	12.8	...	3.3	...	7.0	4.4	4.8	9.2	P^1 absent
uncat.	Chelmir	♂	...	...	...	...	...	...	13.9	13.2	...	3.3	8.8	7.2	4.7	5.0	9.7	P^1 absent
542	Chelmir	♂	...	...	...	...	34.2	...	...	...	...	...	...	...	...	...	...	Alcohol
543	Chelmir	♀	...	...	...	...	33.0	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Pipistrellus savii																		
IPHR 624	Chelmir	♀	...	...	...	...	34.2	...	...	...	...	...	...	...	...	...	...	Alcohol
625	Chelmir	♀	...	...	...	...	33.2	...	...	...	...	...	...	...	...	...	...	Alcohol
632	Chelmir	♀	...	...	...	...	35.7	...	...	...	...	...	...	...	...	...	...	Alcohol
633	Chelmir	♀	...	...	...	...	33.8	...	...	...	...	...	...	...	...	...	...	Alcohol
636	Chelmir	♀	...	...	...	...	35.0	...	...	...	...	...	...	...	...	...	...	Alcohol
639	Chelmir	♀	...	...	...	...	35.0	...	...	...	...	...	...	...	...	...	...	Alcohol
641	Chelmir	♀	...	...	...	...	34.2	...	...	...	...	...	...	...	...	...	...	Alcohol
642	Chelmir	♀	...	...	...	...	32.4	...	...	...	...	...	...	...	...	...	...	Alcohol
646	Chelmir	♂	...	...	...	...	34.5	...	...	...	...	...	...	...	...	...	...	Alcohol
667	Chelmir	♀	...	...	...	...	34.2	...	...	...	...	...	...	...	...	...	...	Alcohol
672	Chelmir	♂	...	...	...	...	33.0	...	...	...	...	...	...	...	...	...	...	Alcohol
711	Chelmir	♀	...	...	...	...	33.4	...	...	...	...	...	...	...	...	...	...	Alcohol
719	Chelmir	♂	...	...	...	...	32.7	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 111468	1 km. SE Maku	♀	89	36	7	14	34	5	...	...	...	3.3	8.2	6.8	4.6	4.9	9.5	P^1 absent
111381	Sar Dasht	♂	91	37	7	13	34	5	13.4	12.7	...	3.4	8.2	6.7	4.5	4.7	9.3	P^1 present
UMMZ 117578	Quyun Daghi Is.	♀	...	...	7.1	...	32	...	12.9	12.5	...	3.6	...	...	5.0	4.7	9.0	P^1 absent
Barbastella l. leucomelas																		
	Mahallat	♂	107.1	55.1	6.9	15.6	42.8	...	15.9	14.8	...	3.7	...	...	4.8	...	...	Etemad, 1969, p. F181
	Mahallat	♂	107.0	55.0	6.4	15.0	42.5	...	15.5	14.4	...	3.7	...	...	4.9	...	...	Etemad, 1969, p. F181
	Tehran	♂	98.7	48.0	8.6	15.3	42.0	...	15.5	14.4	...	3.8	...	...	4.8	...	...	Etemad, 1969, p. F181
FMNH 96766	Sang-e-Sar	♀	117	58	11	19	44.4	...	16.0	14.9	...	3.8	8.1	7.8	4.9	5.4	10.0	
Barbastella l. darjelingensis																		
MMTT 234	M.R.S. Nat. Pk.	♀	100	44	6.8	18	41.6	...	14.2	13.3	...	3.5	7.2	8.2	4.5	4.8	9.8	
Otonycteris hemprichi																		
ZMAS 5444	Bamrud	♀	135.8	61.8	...	41.6	67	19	24.6	23.1	...	4.7	15.1	11.9	8.6	...	...	Holotype of *cinereus*. Ognev, 1928, pp. 448-49
IPHR uncat.	Chelmir	♀	...	53	12	33	63.3	...	23.6	21.7	...	4.4	15.1	11.4	8.7	9.7	17.5	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Otonycteris hemprichi																		
IPHR uncat.	Chelmir	♀	129	57.9	14	32.5	64.8	…	24.5	22.6	…	4.3	15.2	11.5	8.8	9.9	17.8	
545	Chelmir	♀	…	…	…	…	61.6	…	…	…	…	…	…	…	…	…	…	Alcohol
546	Chelmir	♂	…	…	…	…	58.6	…	…	…	…	…	…	…	…	…	…	Alcohol
629	Chelmir	♂	…	…	…	…	58.9	…	…	…	…	…	…	…	…	…	…	Alcohol
631	Chelmir	♂	…	…	…	…	60.7	…	…	…	…	…	…	…	…	…	…	Alcohol
634	Chelmir	♂	…	…	…	…	58.7	…	…	…	…	…	…	…	…	…	…	Alcohol
638	Chelmir	♀	…	…	…	…	59.8	…	…	…	…	…	…	…	…	…	…	Alcohol
640	Chelmir	♂	…	…	…	…	61.5	…	…	…	…	…	…	…	…	…	…	Alcohol
670	Chelmir	♂	…	…	…	…	58.1	…	…	…	…	…	…	…	…	…	…	Alcohol
671	Chelmir	♂	…	…	…	…	61.6	…	…	…	…	…	…	…	…	…	…	Alcohol
713	Chelmir	♂	…	…	…	…	63.2	…	…	…	…	…	…	…	…	…	…	Alcohol
714	Chelmir	♀	…	…	…	…	63.4	…	…	…	…	…	…	…	…	…	…	Alcohol
899	Chelmir	♂	…	…	…	…	60.1	…	…	…	…	…	…	…	…	…	…	Alcohol
?		♀	…	…	…	…	62.1	…	…	…	…	…	…	…	…	…	…	Alcohol, tag missing
Plecotus austriacus																		
BM 63.1199	Kutur Su	?	…	46	8	36	41.0	16	17.0	16.0	…	3.5	8.8	9.2	5.6	6.0	10.7	Alcohol
63.1200	Kutur Su	?	…	45	8	34	39.4	18	16.9	15.8	…	3.5	8.8	9.2	5.4	5.9	10.9	Alcohol
63.1201	Kutur Su	?	…	42	8	36	40.7	18	17.1	15.9	…	3.5	…	9.2	5.4	6.0	11.7	Alcohol
66.3227	Shah Abbas Caves	♀	113	55	11	37	43.9	19	…	…	…	…	…	…	…	…	…	Alcohol
66.3228	Shah Abbas Caves	♀	107	49	10	40	43.5	20	…	…	…	…	…	…	…	…	…	Alcohol
66.3229	Shah Abbas Caves	♂	…	48	10	37	40.7	17	…	…	…	…	…	…	…	…	…	Alcohol, immature, skull not found
	Hamadan	♀	100.6	53.4	8.4	38.3	42.2	…	…	16.5	…	3.4	…	9.1	…	5.4	…	Etemad, 1969, pp. F192-193
	Hamadan	♀	102.8	53.5	8.7	38.0	42.3	…	…	16.3	…	3.7	9.2	…	…	5.7	…	Etemad, 1969, pp. F192-193
	Hamadan	?	96.0	47.9	8.0	30.1	42.0	…	…	16.5	…	3.7	9.2	9.4	…	5.5	…	Etemad, 1969, pp. F192-193
BM 74.25	Malayer	♂	…	…	…	…	…	…	17.9	16.5	…	3.5	9.1	9.4	5.5	6.0	11.5	Skin not seen

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Miniopterus schreibersi																		
BM 7.7.14.7	Bandar-e-Gaz	♀	112	57	11	12	45.7	...	15.4	15.0	...	3.7	8.6	8.9	5.9	6.4	11.9	Holotype of *pallidus*
	Moghan Cave	♀	110.9	57.2	9.3	8.9	40.7	...	...	15.0	...	3.8	9.0	...	6.0	...	...	Etemad, 1969, pp. F199-200
	Azad Khan Cave	♀	113.9	59.1	10.3	9.5	42.8	...	...	15.3	...	3.8	...	...	6.0	...	...	Etemad, 1969, pp. F199-200
	Alisard Cave	♂	111.7	56.9	10.4	8.3	44.8	...	...	...	...	3.8	...	...	6.0	...	...	Etemad, 1969, pp. F199-200
FMNH 96793	Ganjah Kuh Cave	♂	115	58	11	13	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96794	Ganjah Kuh Cave	♂	109	55	10	12	47	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96795	Ganjah Kuh Cave	♂	114	56	11	12	46	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96796	Ganjah Kuh Cave	♂	115	57	10	12	47	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96797	Ganjah Kuh Cave	♂	114	59	10	12	47	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96792	8 km. N Gorgan	♂	107	56	12	13	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96767	Zangamar River Cave	♀	110	51	11	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96769	44 km. SE Maku	♂	117	56	10	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96770	44 km. SE Maku	♀	115	57	11	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96771	44 km. SE Maku	♂	115	60	10	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96772	44 km. SE Maku	♂	119	59	11	11	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Miniopterus schreibersi																		
FMNH 96773	44 km. SE Maku	♂	104	58	10	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96774	44 km. SE Maku	♂	119	58	10	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96775	44 km. SE Maku	♀	104	59	11	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96776	44 km. SE Maku	♀	118	58	11	13	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96777	44 km. SE Maku	♂	115	60	12	11	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96778	44 km. SE Maku	♀	119	63	11	13	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96779	44 km. SE Maku	♂	115	58	11	13	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96780	44 km. SE Maku	♀	115	56	11	12.5	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96781	44 km. SE Maku	♂	119	60	11	12	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96782	44 km. SE Maku	♀	114	55	11	12.5	...	...	...	...	...	...	...	...	...	...	...	Etemad, 1969, pp. F199-200
96799	Shahpur Cave	♂	109	57	10	12	45	...	...	...	...	...	...	...	...	...	...	Alcohol
96800	Shahpur Cave	♀	112	54	11	12	46	...	...	...	...	...	...	...	...	...	...	Alcohol
96801	Shahpur Cave	♀	103	50	9	11	46	...	...	...	...	...	...	...	...	...	...	Alcohol
96802	Shahpur Cave	♀	102	48	10	12	46	...	...	...	...	...	...	...	...	...	...	Alcohol
96803	Shahpur Cave	♀	103	53	12	11	...	...	...	...	...	...	...	...	...	...	...	Alcohol
96804	Shahpur Cave	♀	107	54	11	12	46	...	...	...	...	...	...	...	...	...	...	Alcohol
IPHR 698	Chelmir	♂	...	...	...	...	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
847	20 km. W Mashhad	♂	...	...	...	...	47.2	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Miniopterus schreibersi																		
IPHR 848	20 km. W Mashhad	♂	...	...	...	...	46.7	...	...	...	...	...	...	...	...	...	...	Alcohol
849	20 km. W Mashhad	♂	...	...	...	...	45.7	...	...	...	...	...	...	...	...	...	...	Alcohol
850	20 km. W Mashhad	♂	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Alcohol
851	20 km. W Mashhad	♀	...	...	...	...	46.5	...	...	...	...	...	...	...	...	...	...	Alcohol
852	20 km. W Mashhad	♂	...	...	...	...	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
853	20 km. W Mashhad	♂	...	...	...	...	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
854	20 km. W Mashhad	♀	...	...	...	...	46.4	...	...	...	...	...	...	...	...	...	...	Alcohol
855	20 km. W Mashhad	♂	...	...	...	...	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
856	20 km. W Mashhad	♀	...	...	...	...	45.6	...	...	...	...	...	...	...	...	...	...	Alcohol
857	20 km. W Mashhad	♀	...	...	...	...	47.1	...	...	...	...	...	...	...	...	...	...	Alcohol
858	20 km. W Mashhad	♀	...	...	...	...	45.2	...	...	...	...	...	...	...	...	...	...	Alcohol
859	20 km. W Mashhad	♂	...	...	...	...	44.5	...	...	...	...	...	...	...	...	...	...	Alcohol
860	20 km. W Mashhad	♂	...	...	...	...	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
861	20 km. W Mashhad	♀	...	...	...	...	47.5	...	...	...	...	...	...	...	...	...	...	Alcohol
862	20 km. W Mashhad	♂	...	...	...	...	46.2	...	...	...	...	...	...	...	...	...	...	Alcohol
863	20 km. W Mashhad	♀	...	...	...	...	46.6	...	...	...	...	...	...	...	...	...	...	Alcohol
864	20 km. W Mashhad	♀	...	...	...	...	47.8	...	...	...	...	...	...	...	...	...	...	Alcohol
865	20 km. W Mashhad	♀	...	...	...	...	47.6	...	...	...	...	...	...	...	...	...	...	Alcohol
866	20 km. W Mashhad	♂	...	...	...	...	45.7	...	...	...	...	...	...	...	...	...	...	Alcohol
867	20 km. W Mashhad	♂	...	...	...	...	47.6	...	...	...	...	...	...	...	...	...	...	Alcohol
868	20 km. W Mashhad	♂	...	...	...	...	48.3	...	...	...	...	...	...	...	...	...	...	Alcohol
870	20 km. W Mashhad	♂	...	...	...	...	45.6	...	...	...	...	...	...	...	...	...	...	Alcohol
1008	71 km. SE Mashhad	♀	...	...	...	...	47.7	...	...	...	...	...	...	...	...	...	...	Alcohol
1009	71 km. SE Mashhad	♀	...	...	...	...	47.3	...	...	...	...	...	...	...	...	...	...	Alcohol
1011	71 km. SE Mashhad	♀	...	...	...	...	45.6	...	...	...	...	...	...	...	...	...	...	Alcohol
1012	71 km. SE Mashhad	♀	...	...	...	...	46.1	...	...	...	...	...	...	...	...	...	...	Alcohol
1013	71 km. SE Mashhad	♂	...	...	...	...	45.5	...	...	...	...	...	...	...	...	...	...	Alcohol
1014	71 km. SE Mashhad	♀	...	...	...	...	45.7	...	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Miniopterus schreibersi																		
IPHR 1015	71 km. SE Mashhad	♂	...	...	...	...	47.1	...	...	...	...	...	...	...	...	...	...	Alcohol
2829	4 km. W Abhar	♀	...	...	...	...	47.2	...	...	...	...	...	...	...	...	...	...	Alcohol
2830	4 km. W Abhar	♂	...	...	...	...	47.6	...	...	...	...	...	...	...	...	...	...	Alcohol
2831	4 km. W Abhar	♂	...	...	...	...	47.0	...	...	...	...	...	...	...	...	...	...	Alcohol
2832	4 km. W Abhar	♂	...	...	...	...	47.1	...	...	...	...	...	...	...	...	...	...	Alcohol
2835	4 km. W Abhar	♀	...	...	...	...	46.0	...	...	...	...	...	...	...	...	...	...	Alcohol
2860	4 km. W Abhar	♀	...	...	...	...	47.3	...	...	...	...	...	...	...	...	...	...	Alcohol
2861	4 km. W Abhar	♀	...	...	...	...	46.5	...	...	...	...	...	...	...	...	...	...	Alcohol
2862	4 km. W Abhar	♀	...	...	...	...	47.8	...	...	...	...	...	...	...	...	...	...	Alcohol
2863	4 km. W Abhar	♀	...	...	...	...	46.7	...	...	...	...	...	...	...	...	...	...	Alcohol
2864	4 km. W Abhar	♂	...	...	...	...	47.0	...	...	...	...	...	...	...	...	...	...	Alcohol
2865	4 km. W Abhar	♂	...	...	...	...	45.7	...	...	...	...	...	...	...	...	...	...	Alcohol
2866	4 km. W Abhar	♂	...	...	...	...	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
2867	4 km. W Abhar	♂	...	...	...	...	46.8	...	...	...	...	...	...	...	...	...	...	Alcohol
2868	4 km. W Abhar	♀	...	...	...	...	45.6	...	...	...	...	...	...	...	...	...	...	Alcohol
2869	4 km. W Abhar	♂	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Alcohol
2870	4 km. W Abhar	♀	...	...	...	...	47.2	...	...	...	...	...	...	...	...	...	...	Alcohol
2871	4 km. W Abhar	♀	...	...	...	...	45.7	...	...	...	...	...	...	...	...	...	...	Alcohol
2872	4 km. W Abhar	♀	...	...	...	...	48.0	...	...	...	...	...	...	...	...	...	...	Alcohol
2873	4 km. W Abhar	♀	...	...	...	...	45.4	...	...	...	...	...	...	...	...	...	...	Alcohol
2874	4 km. W Abhar	♂	...	...	...	...	47.2	...	...	...	...	...	...	...	...	...	...	Alcohol
2898	4 km. W Abhar	♂	...	...	...	...	46.2	...	...	...	...	...	...	...	...	...	...	Alcohol
2899	4 km. W Abhar	♂	...	...	...	...	46.4	...	...	...	...	...	...	...	...	...	...	Alcohol
SMF 46663	Mozduran	♀	112	59	11	12	47.5	5	15.4	15.0	...	...	8.7	...	6.0	...	...	Felten, Pers. Comm., 1975
46664	Mozduran	♂	113	57	9	12	46	7	15.3	14.9	...	...	8.7	...	5.9	...	...	Felten, Pers. Comm., 1975
46665	Mozduran	♂	117	58	10	12	46	6	15.6	15.0	...	...	9.0	...	5.9	...	...	Felten, Pers. Comm., 1975
46666	Mozduran	♂	114	56	11	12	46.5	6	15.7	15.4	...	...	8.9	...	5.9	...	...	Felten, Pers. Comm., 1975
46667	Mozduran	♂	112	56	11	12	44.5	5	15.3	14.8	...	...	...	...	5.8	...	...	Felten, Pers. Comm., 1975

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Miniopterus schreibersi																		
SMF 46668	Mozduran	♂	118	60	10	13	45.5	7	15.8	15.3	…	…	9.0	…	6.0	…	…	Felten, Pers. Comm., 1975
46669	Mozduran	♂	113	57	11	11	45.5	5.5	…	…	…	…	…	…	5.9	…	…	Felten, Pers. Comm., 1975
46670	Mozduran	♂	118	60	10.5	12	45.5	6	15.8	15.3	…	…	8.9	…	6.0	…	…	Felten, Pers. Comm., 1975
46671	Mozduran	♂	116	61	10	11	45	5	15.4	15.1	…	…	9.0	…	5.9	…	…	Felten, Pers. Comm., 1975
46672	Mozduran	♀	123	61	10	12	46	7	15.5	15.0	…	…	8.8	…	6.0	…	…	Felten, Pers. Comm., 1975
46673	Mozduran	♀	116	59	11	13	47	7	15.6	15.2	…	…	8.8	…	6.0	…	…	Felten, Pers. Comm., 1975
46674	Mozduran	♀	109	53	10	13	44	6	15.5	15.1	…	…	8.7	…	6.0	…	…	Felten, Pers. Comm., 1975
46675	Mozduran	♀	114	58	10.5	13	47	6.5	15.6	15.1	…	…	8.8	…	6.0	…	…	Felten, Pers. Comm., 1975
46676	Mozduran	♀	116	59	11	14	46	7	15.5	15.0	…	…	8.8	…	6.0	…	…	Felten, Pers. Comm., 1975
46677	Mozduran	♀	118	60	10	13	46	6	15.4	15.1	…	…	8.9	…	6.0	…	…	Felten, Pers. Comm., 1975
USNM 375189	11 km. NW Darab	♂	106	55	18	11	…	6	…	…	…	…	…	…	…	…	…	
FMNH 96701	5 km. SE Pol-i-Abgineh	♀	106	51	11	11	45	5	…	…	…	…	…	…	…	…	…	Alcohol
96703	5 km. SE Pol-i-Abgineh	♀	108	48	11	11	44	5	…	…	…	…	…	…	…	…	…	Alcohol
96705	5 km. SE Pol-i-Abgineh	♂	110	56	11	11	45	5	…	…	…	…	…	…	…	…	…	Alcohol
96707	5 km. SE Pol-i-Abgineh	♀	107	52	11	11	44	5	…	…	…	…	…	…	…	…	…	Alcohol
96713	5 km. SE Pol-i-Abgineh	♀	110	51	11	11	46	5	…	…	…	…	…	…	…	…	…	Alcohol
96718	5 km. SE Pol-i-Abgineh	♂	105	50	11	11	45	5	…	…	…	…	…	..	…	…	…	Alcohol
111551	Gara Tarik Cave	♂	121	60	10	10	48	6	15.2	14.9	…	3.7	8.6	8.8	5.7	6.0	…	
111552	Gara Tarik Cave	♂	116	64	11	11	45	6	…	…	…	…	…	…	…	…	…	
111553	Gara Tarik Cave	♂	119	59	11	11	48	7	…	…	…	…	…	…	…	…	…	
111554	Gara Tarik Cave	♀	118	58	10	10	47	6	…	…	…	…	…	…	…	…	…	
111555	Gara Tarik Cave	♀	115	65	11	10	47	6	…	…	…	…	…	…	…	…	…	
111556	Gara Tarik Cave	♂	113	60	10	10	48	5	15.3	15.0	…	3.5	8.6	8.7	5.7	6.2	11.8	
111557	Gara Tarik Cave	♂	117	57	10	10	47	6	…	…	…	…	…	…	…	…	…	Alcohol
111558	Gara Tarik Cave	♂	114	57	11	10	47	5	…	…	…	…	…	…	…	…	…	Alcohol
111559	Gara Tarik Cave	♀	118	57	11	11	46	6	15.5	14.9	…	3.5	…	8.7	5.7	6.1	11.2	
111560	Gara Tarik Cave	♂	118	59	10	11	46	6	15.6	15.2	…	3.8	8.6	8.9	5.9	6.4	11.9	
111561	Gara Tarik Cave	♂	117	58	10	12	45	6	15.6	15.1	…	3.7	8.7	9.0	5.9	6.1	11.8	

Identification	Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	$C\text{-}M^3$	$C\text{-}M_3$	ML	Remarks
Miniopterus schreibersi																	
FMNH 111562 Gara Tarik Cave	♀	...	...	12	11	48	6	...	...	...	...	...	...	...	...	...	
111563 Gara Tarik Cave	♀	...	...	12	10	47	6	...	...	...	...	...	...	...	...	...	
111564 Karaftu	♀	123	58	11	12	46	6	...	15.1	...	3.8	...	8.7	6.0	6.3	11.3	
111565 Karaftu	♀	121	57	11	12	45	7	...	14.8	...	3.6	8.5	8.7	5.7	5.8	11.1	
111566 Karaftu	♀	120	58	11	12	46	7	...	...	...	...	...	...	...	...	...	
111567 Karaftu	♀	120	56	12	11	45	7	15.3	14.7	...	3.6	8.7	8.7	5.9	6.2	11.1	
111568 Karaftu	♂	116	56	12	10	46	7	...	...	...	...	...	...	...	...	...	Alcohol
111569 Karaftu	♀	117	59	14	11	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111570 Karaftu	♂	115	53	11	11	46	6	15.5	14.9	...	3.6	8.5	8.7	5.7	6.1	11.7	
111571 Karaftu	♀	115	57	11	11	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111500 Korie Cowat Cave	♂	116	54	12	14	47	5	15.6	14.8	...	3.6	8.5	8.6	5.6	6.0	11.5	
111501 Korie Cowat Cave	♂	121	57	11	13	42	6	14.9	13.9	...	3.6	8.4	8.3	5.4	6.0	11.1	
111502 Korie Cowat Cave	♂	122	58	11	14	47	5	15.8	15.4	...	3.7	...	8.8	5.9	6.2	11.8	
111503 Korie Cowat Cave	♀	122	57	11	13	47	5	...	...	...	...	...	...	...	...	...	
111504 Korie Cowat Cave	♀	120	58	11	14	48	5	15.5	15.0	...	3.6	...	8.5	5.7	6.5	10.9	
111505 Korie Cowat Cave	♀	119	56	11	13	45	6	15.1	14.8	...	3.5	...	8.6	5.6	6.0	11.3	
111506 Korie Cowat Cave	♂	114	58	11	14	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111507 Korie Cowat Cave	♂	120	60	11	14	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111508 Korie Cowat Cave	♂	115	51	10	14	44	6	...	...	...	...	...	...	...	...	...	Alcohol
111509 Korie Cowat Cave	♀	113	54	11	14	45	5	...	...	...	...	...	...	...	...	...	Alcohol
111510 Korie Cowat Cave	♀	118	59	11	14	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111511 Korie Cowat Cave	♀	114	57	11	14	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111512 Korie Cowat Cave	♀	117	58	11	14	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111513 Korie Cowat Cave	♀	112	58	10	13	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111514 Korie Cowat Cave	♂	110	56	11	14	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111515 Korie Cowat Cave	♀	114	56	11	13	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111516 Korie Cowat Cave	♂	116	57	10	9	...	4	...	...	...	...	...	...	...	...	...	Alcohol
111572 Sarin Ab-Garma Cave	♀	114	54	10	12	45	7	15.0	14.4	...	3.6	8.3	8.5	5.7	5.9	11.3	

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M_3	ML	Remarks
Miniopterus schreibersi																		
FMNH 111573	Sarin Ab-Garma Cave	♀	107	56	11	11	45	6	15.2	14.6	...	3.6	8.4	8.5	5.7	6.0	11.3	
111574	Sarin Ab-Garma Cave	♀	122	59	12	12	49	6	...	...	...	...	...	...	...	...	...	Alcohol
111575	Sarin Ab-Garma Cave	♂	118	57	9	10	45	6	...	...	...	...	...	...	...	...	...	Alcohol
111576	Sarin Ab-Garma Cave	♂	109	57	11	11	44	5	...	...	...	...	...	...	...	...	...	
111577	Sarin Ab-Garma Cave	♂	119	58	12	11	48	5	15.2	14.9	...	3.7	...	8.8	5.8	6.1	11.6	
111578	Sarin Ab-Garma Cave	♂	121	56	11	11	48	6	15.4	14.9	...	3.6	8.5	8.5	5.7	6.1	11.9	
111579	Sarin Ab-Garma Cave	♀	117	56	11	11	45	6	15.4	14.6	...	3.6	8.4	8.7	5.6	6.0	11.1	
111580	Sarin Ab-Garma Cave	♀	116	56	12	11	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111581	Sarin Ab-Garma Cave	♀	112	57	12	11	45	6	...	...	...	...	...	...	...	...	...	Alcohol
111582	Sarin Ab-Garma Cave	♀	121	57	12	11	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111583	Sarin Ab-Garma Cave	♂	115	56	11	11	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111584	Sarin Ab-Garma Cave	♂	113	56	11	11	46	6	...	...	...	...	...	...	...	...	...	Alcohol
112523	Sarin Ab-Garma Cave	?	110	54	11	11	45	5	...	...	...	...	...	...	...	...	...	Alcohol
111517	Shahpur Cave	♂	119	59	12	12	44	6	...	...	...	...	...	...	...	...	...	
111518	Shahpur Cave	♀	118	62	12	11	43	5	...	...	...	...	...	...	...	...	...	
111519	Shahpur Cave	♀	110	52	12	11	43	6	...	...	...	...	...	...	...	...	...	
111520	Shahpur Cave	♂	118	58	12	11	43	6	...	...	...	...	...	...	...	...	...	
111521	Shahpur Cave	♂	120	59	12	11	43	6	...	...	...	...	...	...	...	...	...	
111522	Shahpur Cave	...	118	59	11	12	44	7	...	...	...	...	...	...	...	...	...	
111523	Shahpur Cave	♂	118	58	11	11	44	6	...	...	...	...	...	...	...	...	...	
111524	Shahpur Cave	♂	115	56	11	11	42	6	14.5	14.3	...	3.6	8.5	8.5	5.5	6.0	10.9	
111525	Shahpur Cave	♀	118	60	12	12	45	7	15.1	14.7	...	3.6	8.2	8.4	5.6	6.0	11.2	
111526	Shahpur Cave	♀	118	57	11	12	44	7	15.1	14.4	...	3.5	8.4	8.5	5.6	6.0	11.3	
111527	Shahpur Cave	♂	120	57	12	12	45	7	15.1	14.7	...	3.5	8.4	8.3	5.6	6.0	11.1	
111528	Shahpur Cave	♀	118	49	10	11	49	6	15.4	14.5	...	3.5	8.5	8.5	5.5	6.0	11.2	
111529	Shahpur Cave	♂	119	50	11	12	...	6	...	...	...	...	...	...	...	...	...	
111530	Shahpur Cave	♀	112	57	11	12	47	6	...	...	...	...	...	...	...	...	...	
111531	Shahpur Cave	♀	115	50	11	11	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111532	Shahpur Cave	♀	120	54	11	12	48	6	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M^3	C-M$_3$	ML	Remarks
Miniopterus schreibersi																		
FMNH 111533	Shahpur Cave	♂	115	51	11	11	48	6	...	...	...	...	...	...	...	...	...	Alcohol
111534	Shahpur Cave	♂	120	58	10	10	46	6	...	...	...	...	...	...	...	...	...	Alcohol
111535	Shahpur Cave	♂	115	45	12	12	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111536	Shahpur Cave	♀	121	50	12	11	48	6	...	...	...	...	...	...	...	...	...	Alcohol
111537	Shahpur Cave	♀	121	55	7	8	49	7	...	...	...	...	...	...	...	...	...	Alcohol
111538	Shahpur Cave	♀	112	50	11	11	...	6	...	...	...	...	...	...	...	...	...	Alcohol
111539	Shahpur Cave	♀	122	49	12	11	47	7	...	...	...	...	...	...	...	...	...	Alcohol
111540	Shahpur Cave	♀	115	52	10	12	48	6	...	...	...	...	...	...	...	...	...	Alcohol
111541	Shahpur Cave	♀	111	52	11	12	48	6	...	...	...	...	...	...	...	...	...	Alcohol
111542	Shahpur Cave	♀	115	52	11	11	47	6	...	...	...	...	...	...	...	...	...	Alcohol
111543	Shahpur Cave	♂	110	51	10	10	44	5	...	...	...	...	...	...	...	...	...	Alcohol
111544	Shahpur Cave	♀	116	49	11	10	46	5	...	...	...	...	...	...	...	...	...	
111545	Shahpur Cave	♂	117	49	12	10	45	5	...	...	...	...	...	...	...	...	...	
111546	Shahpur Cave	♀	124	55	12	10	48	6	...	...	...	...	...	...	...	...	...	
111547	Shahpur Cave	♀	115	52	11	11	47	6	...	...	...	...	...	...	...	...	...	
111548	Shahpur Cave	♀	113	49	11	11	46	6	...	...	...	...	...	...	...	...	...	
111549	Shahpur Cave	♂	113	50	10	11	46	6	...	...	...	...	...	...	...	...	...	
111550	Shahpur Cave	♀	118	54	11	11	48	6	...	...	...	...	...	...	...	...	...	
IPHR uncat.	Chelmir	♂	103	44	9	7	47.3	...	15.5	15.0	...	3.6	8.9	8.8	5.9	6.3	11.5	
uncat.	Chelmir	♂	102	48	9	8	47.1	...	15.0	15.1	...	3.7	8.9	8.6	5.9	6.4	11.8	
uncat.	Chelmir	♀	...	...	...	...	...	...	15.6	15.0	...	3.8	8.9	8.6	5.8	6.3	11.7	
uncat.	Chelmir	♂	...	...	10.0	...	46.9	...	15.6	15.1	...	3.7	...	8.7	5.9	6.3	11.7	
MMTT 235	Quyn Daghi Is.	♂	115	48	8.6	9	45.1	...	16.9	...	...	...	...	...	...	...	...	GLS on skin tag, skull not found
Tadarida teniotis																		
BM 97.11.10.2	Bushehr	♀	...	45	11	25	58.8	5	23.7	22.8	...	4.7	13.3	12.1	8.6	9.4	17.0	Alcohol
10.8.12.5	"Foot of Elburz"	♀	128	47	12	25	60.1	5	...	...	...	...	...	...	...	...	...	Alcohol

Identification		Sex	TL	T	HF	E	FA	Tr	GLS	CBL	CCL	IO	ZW	BB	C-M³	C-M₃	ML	Remarks
Tadarida teniotis																		
IPHR 626	Chelmir	♀	...	...	...	...	57.6	...	...	...	...	...	...	...	...	...	...	Alcohol
630	Chelmir	♂	...	...	...	...	59.6	...	...	...	...	...	...	...	...	...	...	Alcohol
705	Chelmir	?	...	...	...	...	58.3	...	...	...	...	...	...	...	...	...	...	Alcohol
706	Chelmir	♂	...	...	...	...	61.3	...	...	...	...	...	...	...	...	...	...	Alcohol
FMNH 111598	Minab	♂	123	45	11	27	58	6	...	...	...	...	...	...	...	...	...	Alcohol
IPHR uncat.	Bushehr	♂	...	41.5	9.5	23	60.1	...	...	...	...	4.8	...	12.5	8.6	9.3	16.7	
Tadarida aegyptiaca																		
FMNH 111596	Chah Moslem	♂	131	45	11	26	55.5	4	21.7	21.3	...	5.9	12.8	11.6	8.2	8.9	15.4	
111597	Chah Moslem	♂	133	46	11	26	52.8	6	21.2	20.9	...	6.2	...	12.0	8.0	8.8	15.6	